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Physical Profile of Preterm Children in Ahmednagar District of Maharashtra, India

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Abstract

With survival rates of preterm and low-birth weight infants improving, there is an increase in the number of these infants with motor impairments later in life, ranging from developmental coordination disorder to cerebral palsy (CP). Infant neuromotor examinations are performed for a variety of purposes, including discriminating between infants who have motor dysfunction and those who are developing typically (discriminative tool), predicting which infants will have future motor problems from current performance (predictive tool), and evaluating changes over time (evaluative tool).

Objective: This report describes the physical and functional status of preterm and low birth infants in Ahmednagar district of Maharashtra.

Method: An observational study was conducted in which INFANIB was administered on 43 preterm and low birth weight infants with corrected age of 10 days-120 days. All the components of INFANIB were administered to these infants except component no. 11,12,16,17. After administration of INFANIB the score from each component were summed together and calculated the final score. According to these final score each infant were categorized into 3 categories that is Normal, Abnormal and Transient.

Results: According to standard cut off points of INFANIB 4 infants were fall in Abnormal category and remaining 39 infants were fall in category of transient. When mean was calculated of all the components of INFANIB we found that the 2nd and 5th component is more affected when compare with other component (mean=2.9, 2.8, resp.). When the total mean score compared with Degree of Normality to abnormality with age 7 months or less we found that all the infants are fall into moderately abnormal category (mean=55.5).

Conclusion: The present study concluded that when INFANIB is administered to assess the physical profile of preterm children in Ahmednagar city out of 43 patients 4 infants were fall in Abnormal category and remaining 39 infants were fall in category of transient.

Keywords: Physical profile; Preterm children; INFANIB

Introduction

With survival rates of preterm and low-birth weight infants improving, there is an increase in the number of these infants with motor impairments later in life, ranging from developmental coordination disorder to cerebral palsy (CP) [1]. Infant neuromotor examinations are performed for a variety of purposes, including discriminating between infants who have motor dysfunction and those who are developing typically (discriminative tool), predicting which infants will have future motor problems from current performance (predictive tool), and evaluating changes over time (evaluative tool) [2]. There is a growing body of evidence that the first year of an infant's life is a critical period of brain development [3]. The process of neuronal differentiation, which includes the formation of dendrites and axons, and the production of neurotransmitters and synapses, is particularly active in the few months before and after term [4]. Myelination begins during the second trimester and is most rapid in the first year of life, and the process continues up to 30 years of age [3]. It is, therefore, important that infants with motor dysfunction are identified early so that appropriate interventions can be implemented. Early neuromotor assessments can be challenging because motor development in the first year of life is rapid and extensive and is influenced by biological, environmental, and social factors [5]. Repeated assessments may reveal widely different which may result in the motor development of preterm infants incorrectly being labeled as 'abnormal' [6]. These variations in motor development over the first year can be for a variety of reasons, including behaviours learned during long periods in neonatal intensive care and alterations to brain development caused by exposure to the *ex utero* environment during critical periods of brain development. These results in infants who have less flexed postures and are more extended than infants born at term [1]. A standardized assessment tool appropriate for preterm infants that has a consistent set of procedures for administering and scoring an assessment should, therefore, be used to ensure that all individuals are assessed under similar conditions. Longitudinal assessments, rather than a single assessment, are more predictive because they give information on developmental progression including monitoring peaks, plateaux, and, in some cases, regression of infants [7,8]. For this

reason, it is important to ensure that assessment tools can be used at more than one time point in the infant's development.

Objective

This report describes the physical and functional status of preterm and low birth infants in Ahmednagar district of Maharashtra.

Methodology

An ethical clearance was obtained from institutional review board of PDVVPF's COPT Ahmednagar. After obtaining ethical clearance, and informed consent from parents of these infants a survey using INFANIB was administered on 43 preterm and low birth weight infants with corrected age of 10 days-120 days. All the components of INFANIB were administered to these infants except component no. 11, 12, 16, 17. After administration of INFANIB the score from each component were summed together and calculated the final score. According to these final score each infant were categorized into 3 categories that is Normal, Abnormal and Transient. Wei Liao et al. [9] conducted a study on Predicting neurodevelopmental outcomes for at-risk infants: reliability and predictive validity using a Chinese version of the INFANIB and he found the cut of points for INFANIB: for infants <4 months old, abnormal ≤ 48, transient=49–65, and normal ≥ 66. For infants 4 to 8 months old, the cut points were abnormal ≤ 54, transient=55-71, and normal ≥ 72. For infants ≥ 8 months old, the cut points were abnormal ≤ 68, transient=69-82, and normal ≥ 83.

Infant Neurological International Battery is constructed for the Assessment of Neurological Integrity in Infancy and evaluates abnormality in tone and posture. The advantage of INFANIB is simple and time-saving as compared with Peabody developmental Measure Scale. According to Wei Liao et al. [9] the interclass correlation coefficient and intraclass correlation coefficient values for the INFANIB at 3, 7 and 10 months were >0.8, indicating excellent reliability with regard to inter- and intraobserver differences. The specificity, sensitivity, positive predictive value and negative predictive value were high for both high-risk premature infants and full-term infants at the age of 10 months. For premature infants at the age of 7 months or below, INFANIB had low validity for detecting abnormalities.

Results

The 43 preterm infants with the mean corrected age were 45.92 days and the mean of birth weight was 2.71 kg. According to standard cut off points of INFANIB 4 infants were fall in Abnormal category and remaining 39 infants were fall in category of transient. When mean was calculated of all the components of INFANIB we found that the 2nd and 5th component is more affected when compare with other component (mean=2.9, 2.8, resp.) As the maximum score of each component are 5. When the total mean score compared with Degree of Normality to abnormality with age 7 months or less we found that all the infants are fall into moderately abnormal category (mean=55.5) (Figure 1).

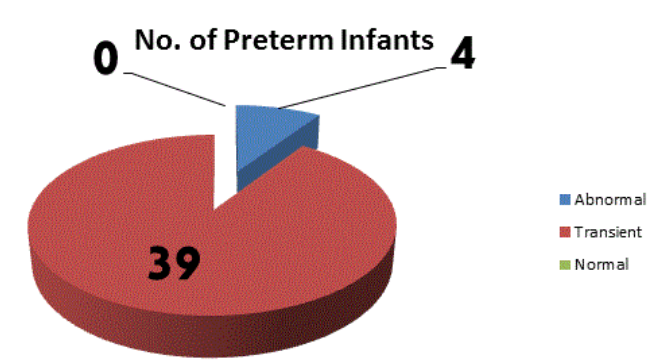

Figure 1: Shows no. of preterm infants according to the category of INFANIB.

Discussion

The result of the present study indicate that when the preterm infants assessed by the INFANIB almost 91% infants fall into transiently abnormal category. The purpose of the present study was to evaluate the physical profile of Preterm children in Ahmednagar district of Maharashtra India. For this all preterm infants were assessed by INFANIB. Infant Neurological International Battery is constructed for the Assessment of Neurological Integrity in Infancy and evaluates abnormality in tone and posture. The advantage of INFANIB is simple and time-saving as compared with Peabody developmental Measure Scale. According to Wei Liao et al. [9] the interclass correlation coefficient and intraclass correlation coefficient values for the INFANIB at 3,7 and 10 months were >0.8, indicating excellent reliability with regard to inter-and intraobserver differences. The specificity, sensitivity, positive predictive value and negative predictive value were high for both high-risk premature infants and full-term infants at the age of 10 months. For premature infants at the age of 7 months or below, INFANIB had low validity for detecting abnormalities. One study was conducted by Patricia [10] on construction of an Infant Neurological International Battery (INFANIB) for the Assessment of Neurological Integrity in Infancy they found that out of 365 preterm infants 169 infants were fall into normal category whereas 194 infants fall into abnormal and transient category which is similar to the result of our study.

Another study was conducted by Koumudi [11] on Early Predictors of neurodevelopmental outcome in high risk infants one year longitudinal follow up study to find out a few simple and easily elicitable items at three and six months of age that can predict neurodevelopmental outcome at one year in high risk babies. A One year longitudinal follow up study at Hospital based study including inborn and outborn infants discharged from the Neonatal Intensive Care Unit (NICU) of a referral hospital, followed up in a High Risk Clinic to find out a few simple and easily elicitable items at three and six months of age that can predict neurodevelopmental outcome at one year in high risk babies. Sixty high risk babies were followed up longitudinally for a period of one year. A detailed neurodevelopmental examination was done with special attention to the following items-axillary suspension, head support, social smile, disappearance of primitive reflexes and neurobehavior at three months ago while pull to sit, rolling over, sitting momentarily without support, transfer of objects and voluntary reach were evaluated at six months age. Bayley

Scales of Infant Development (Baroda Norms) was used for assessing the outcome at one year. Babies with absence of social smile, abnormal neurobehavior at three months and absent pulling to sit position, absent voluntary reach, and absent transfer of objects, remained delayed at one year. The specificity of each of these items was 100%. These items had a positive predictive value of 100%. The study concluded that inability to achieve social smile and abnormal neurobehavior at three months age and absence of pulling to sit position, transfer of objects and voluntary reach at six months age, warrant early intervention. These items are easy to elicit, do not require any special kit or elaborate training. Hence these items can be tested even by those working at the primary level or in office practice.

The study conducted by Raweewan and Joan [12] on Scarf ratio: A method of measuring the Scarf sign in preterm born infants in this study Longitudinal data for the Scarf ratio were measured in a cohort of 111 Thai preterm born infants. The data were collapsed into four age ranges, i.e., 28-31, 32-36, 37-39 and 40 weeks post-conceptional age (PCA) according to the trends from the longitudinal plots. As the means of the Scarf ratio increased with age, it can be described that the resistance to the passive movements of the arm increased when the infants grew up. Data were also converted to a newly developed categorical scoring system. All infants between the age of 28 and 31 weeks PCA recorded a score of 1 (low tone). Most infants aged 32–36 and 37–39 weeks PCA recorded a score of 2 while most infants aged 40 weeks PCA obtained a score of 3 (high tone). Thus, this method can be an alternative when continuous data for the Scarf sign are desirable. The study concluded that Preterm infants aged 28 to 31 weeks PCA recorded a lower scarf ratio than did infants who were older, a finding which is consistent with the lower muscle tone of the upper trunk and limbs present in this age range.

Conclusion

The present study concluded that when INFANIB is administered to assess the physical profile of preterm children in Ahmednagar city out of 43 patients 4 infants were fall in Abnormal category and remaining 39 infants were fall in category of transient.

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