

Obstetrics Determinants of Cerebral Palsy in Children from Birth to Five Years

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ABSTRACT

Objective: To determine obstetrics risk factors for cerebral palsy from birth to 5 years children

Study Design: A hospital based cross sectional survey.

Place and Duration of Study: This study was conducted in outpatient Department, Institute of Physical Medicine and Rehabilitation, Dow University of Health Sciences Karachi, Pakistan during October 2007 to October 2010.

Materials and Methods: Children with cerebral palsy between births to 5 years of age were included in the study. The Sampling technique was non probability purposive. Data was analyzed as frequency and association by chi-square in SPSS version 15.

Results: Children enrolled in this study were 300 their Mean age $\pm$ SD was age 4.9 $\pm$ SD 3.6 yrs. Mean maternal age $\pm$ SD was 30.8 $\pm$ 6.5 years. Mostly mothers had secondary level of education 110 (36.7). Father's Mean income $\pm$ SD was 11587 $\pm$ SD. During assessment the pregnancy risk factors were mostly hypertension 55 (18.3%), diabetes mellitus 28 (9.3%) seizures 11 (3.7%) placenta previa 4 (1.3%). The commonest risk factor was birth asphyxia in one third of children and two third of the deliveries were conducted in institutions as spontaneous vaginal deliveries.

Conclusion: Birth asphyxia is the major obstetrics risk factors for cerebral palsy from birth to 5 years children. The obstetrics practices require revisiting and reprogramming to reduce cerebral palsy.

Key Words: Obstetrics determinants, Cerebral palsy, Children, Birth, Birth asphyxia, Preterm labour.

INTRODUCTION

Cerebral palsy (CP) is a condition described as a static lesion occurring in the immature brain development in children with a permanent motor impairment. Incidence of CP is 7 per 1000 live births.¹ CP has been classified in 3 major groups, developmental defect, infarction of middle cerebral artery occlusion and neonates trauma during or after delivery.² CP has been associated with complications during the obstetric period. Asphyxia before birth, hypoxia of the brain, birth trauma during labor and problems in intrauterine development are the primary causes of CP.³

A study on the prevalence of CP in United States, reported that there were on an average 3.6 cases of CP per 1000, and the prevalence was higher in low middle-income neighborhoods as compared to high-income neighbourhoods.⁴ There has been a discrepancy in the knowledge of the prevalence and associated factors of CP in our country. CP requires mothers and physicians to be made aware of CP in Pakistan. At present the treatment for CP is limited to Botulinum toxin type-A, which has decreased spasticity and increased range of motion⁵ and surgical treatment of the limb.⁴ A study from Faisalabad showed that majority of children had spastic CP followed by extra-pyramidal CP. Amongst spastic CP, quadriplegia was the most common type followed by diplegia, hemiplegia and mixed CP. Birth asphyxia 36% was the major contributor to CP followed by meningoencephalitis 34%, prematurity and low birth weight 8%, Kernicterus 5.5% and

intracranial bleed 2.5%. In this study 14% CP remained undiagnosed etiologically.⁶

CP has been associated with socio-economic burden on poor mothers and insufficient nonfunctional health system. There has been a need to comprehend with the frequency of children diagnosed with CP and the importance of decreasing its detrimental effect on our socio-economic burden. The better medical care during peri-natal period for the high-income community decreased the prevalence of CP. In our hospital based deliveries with skilled birth attendants and negligent obstetric care in rural and urban areas it is important to explore the prevalence and associated risk factors of CP in children from birth to 5 years in Pakistan. This study was conducted to determine obstetrics risks factors for cerebral palsy in children from birth to five years.

MATERIALS AND METHODS

A hospital based cross sectional survey was conducted in outpatient department, Institute of Physical Medicine and Rehabilitation, Dow University of Health Sciences Karachi, Pakistan. All cases reported and registered during Oct 2007- Oct 2010. Children with cerebral palsy between births to 5 years of age were included in the study. All children were excluded having following morbidity or associated factors on examination in outpatients department:

- Delayed milestone
- Mental retarded
- Club feet
- Hip dislocation

- Down's syndrome
- Spina bifida
- Neuropathy
- Muscular dystrophy
- Patient with multiple congenital anomaly

We registered in OPD 204 cerebral palsy children. They were managed at Institute of Physical Medicine and Rehabilitation (IPMR) Dow University of Health Sciences. A total of 1864 children reported during Oct 2007-Sep 2010. All children aged birth– 05 years finally diagnosed as cerebral palsy was included in the study. All children were assessed by cerebral palsy assessment form, developed for collecting data. Most of the cases were diagnosed cerebral palsy from different specialty of pediatrics, medicine, surgery, orthopedics and Institute of Physical Medicine and Rehabilitation. Cerebral palsy assessment included (Name, age, sex, and patient's education, mode of delivery, place of delivery, pregnancy risk factor, prenatal risk factor, perinatal and postnatal risk factor.

All cerebral palsy assessment forms were filled by physiatrists at out patient department. A detailed history has been taken from mother /father or caregiver. The diagnosed cerebral palsy children were then referred to appropriate department of IPMR like Occupational Therapy, Physiotherapy and Prosthetics & Orthotics. The Sampling technique was non probability purposive. Data was analyzed as frequency and association by chi-square in SPSS version 15.

RESULTS

Table No.1: Characteristics of study population of patients (n = 300)

Variables	Number of Cases
Maternal age	
Mean $\pm$ SD	30.8 $\pm$ 6.5 years
Range	15 - 70 years
Maternal income	
Mean $\pm$ SD	11587 $\pm$ 7913 Rs
Range	1000 - 50000 Rs
Maternal Education Level	
Nil	98 (32.7%)
Primary	58 (19.3%)
Secondary	110 (36.7%)
Graduate	28 (9.3%)
Professionals	6 (2%)
Child age	
Mean $\pm$ SD	4.9 $\pm$ 3.6 years
Child Sex	
Male	170 (56.7%)
Female	130 (53.3%)

Table No.2: Types of Cerebral Palsy in children

Types of CP	Frequency
Spastic	240 (80%)
Athetoid	39 (13%)
Ataxic	19 (6.3%)
Mixed	2 (0.7%)
Type of Spastic	
Diaplegic	174 (58%)
Quadriplegic	88 (29.3%)
Hemiplegic	38 (12.7%)
Associated Problem	
None	266 (88.7%)
Mental retardation	32 (10.6%)
Autistic	2 (0.7%)

Table No.3: Obstetrics determinants of cerebral palsy in children from birth to five years

	Frequency
Pregnancy Risk Factors	
None	200 (66.7%)
Hypertension	55 (18.3%)
Maternal diabetes	28 (9.3%)
Seizures	11 (3.7%)
Placenta previa	4 (1.3%)
Hyperthyroidism	1 (0.3%)
Mental retardation	1 (0.3%)
Place of Delivery	
Hospital	254 (84.7%)
Home	46 (15.3%)
Delivery Conducted by	
Doctor	244 (81.3%)
Dai	46 (15.3%)
Nurse	6 (2%)
Lady Health Visitors	3 (1%)
Relative	1 (0.3%)
Mode of Delivery	
SVD	227 (75.7%)
CS	61 (20.3%)
FVD	12 (4%)
Indications of Cesarean Sections (CS)	
Elective CS	51 (17%)
Emergency CS	10 (3.3%)
Gestational Age	
Term	252 (84%)
Preterm	48 (16%)
Duration of second stage of Labor	
30 minutes	8 (2.7%)
60 minutes	100 (33.3%)
90 minutes	41 (13.7%)
Above 90 minutes	67 (22.3%)

Children enrolled in this study were 300 their Mean age $\pm$ SD was age 4.9 $\pm$ SD 3.6 yrs. , males were 170 (56.7%) female were 130 (53.3%). Mean maternal age $\pm$ SD was 30.8 $\pm$ 6.5 years as shown in Table 1. Mostly mothers had secondary level of education 110 (36.7) then 98 mothers (32.7%) were illiterate, 58 (19.3%) were primary passed and 28 (9.3%) were graduate. only 6 (2%) were professionals with some vocational skills. Father's Mean income $\pm$ SD was 11587 $\pm$ SD.

The assessment form contained 7 questions, targeting pregnancy risk factor, obstetric history, labour history, type of CP, associated problem, neonatal risk factor and postnatal. The types of CP in children are shown in Table 2. During assessment the pregnancy risk factors were mostly hypertension 55 (18.3%), diabetes mellitus 28 (9.3%) seizures 11 (3.7%) placenta previa 4 (1.3%). The Obstetrics determinants of cerebral palsy in children from birth to five years are shown in Table 3.

DISCUSSION

Three children with cerebral palsy attending IPM and R at cerebral palsy clinic were analyzed to determine the frequency and associated risk factors. Fifty-four per cent of the children had more than one associated disability. Mostly 93% of the patients had been referred by a primary care physician. The study emphasizes the need for comprehensive evaluation of all children at an early neonatal age with cerebral palsy.

Cerebral palsy (CP) is the most common cause of motor disability in children. Maternal and fetal risk factors leading to CP were observed in developing countries and found that the incidences of cerebral palsy are related to poverty, birth asphyxia and preterm birth. This study provides a basis for the initiation and development of appropriate and integrated services for CP children at an institute for rehabilitation. Early detection and appropriate follow up is recommended for all children in their first year of life. The role of parents and caregivers in seeking early help should be strengthened to reduce the suffering of CP children and their families. Major determinants were Preterm deliveries 48%, Birth asphyxia 36% and hyperbilirubinemia 30% in CP children. An improvement in quality of labour management by birth attendants is needed to reduce the incidence of cerebral palsy. Early detection is recommended for all children in first year of life for treatment purpose.

Cerebral palsy is motor and postural disorder limiting the child's ability to carry out activities of daily living. Cerebral palsy damages the motor control centers of the developing brain during pregnancy, labour and after birth.⁷⁻⁹ The incidence of CP varies from 1-6/1000 live births.¹⁰ This incidence of cerebral palsy is static despite advances in medical science. The current study showed that the commonest spastic Cerebral palsy in 80 %, athetoid 13 % and ataxic 19%. This frequency is

similar to other studies.¹¹⁻¹² In Pakistan the incidence of preterm labour is 37 % according to Pakistan Health Demographic survey 2008 and studies have found that preterm labour is associated with CP children. This study found CP children in 48 % preterm babies.¹³ the advance obstetrician care ultimately will improve the survival rate of premature babies as observed in some interventions globally.¹⁴

Major causes of CP include prenatal, perinatal and postnatal factors. However, researches have shown birth asphyxia as the most prevailing factor causing CP¹⁵. In our study with a sample of 300 CP children the most common causes were preterm birth , birth asphyxia, maternal hypertension, institutional deliveries.

Another case control study conducted in Saudi Arabia, reported the major cause of CP were both low birth weight and preterm birth below 32 weeks, consanguinity marriages and twin pregnancies.¹⁶ Birth Asphyxia accounts for 36%¹⁷ and in our study it one third of the babies had birth asphyxia. About three quarters of babies had spontaneous vaginal deliveries and 20 % of them had cesarean sections.

Pakistan is one of the non-achievers countries of Millennium Development Goals (MDG) five and six which include improving maternal health and reducing child mortality and morbidity.¹⁸ Preterm birth occur in one third of deliveries in Pakistan and one third of preterm births suffer from permanent disabilities in motor and brain development. Mostly the second stage of labour lasted for 33.3% in this sample , therefore, the improvement in the conduct of training in emergency obstetric practices is required as national emergency services on priority basis. Birth asphyxia is the major obstetrics risk factors for cerebral palsy from birth to 5 years children in this study.¹⁹⁻²⁰ A national program on standard obstetrics practices is needed to reduce cerebral palsy. These public health interventions will help in achieving the MDGs five and six in Pakistan.

CONCLUSION

Birth asphyxia is the major obstetrics risk factors for cerebral palsy from birth to 5 years children. The obstetrics practices require revisiting and reprogramming to reduce cerebral palsy.

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