Original Research Article

Study of Certain Demographic Factors of Cerebral Palsy

Tatavarti Srinivasa Rao[1*], Telidevara Durga Poorna Subbalakshmi[2], Y. Siva Sai Kumar Reddy[3]

[1]Associate Professor, Department of Orthopaedics, Andhra Medical College, Visakhapatnam, Andhra Pradesh, India.

[2]Assistant Professor, Department of Anaesthesiology, Rangaraya Medical College, Kakinada, East Godavari District, Andhra Pradesh, India

[3]Assistant Professor, Department of Orthopaedics, GITAM Institute of Medical Sciences and Research, GITAM Deemed to be University, Visakhapatnam, Andhra Pradesh, India.

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Abstract

Back ground: Cerebral palsy is a musculoskeletal illness that causes disabilities owing to injury to the developing brain. The brain damage is permanent and non-progressive. Because the musculoskeletal system grows with age, the effects of brain damage progresses. **Aim:** To study certain demographic factors pertaining to cerebral palsy affected children like sex, maternal age at the time of conception of the affected child, mother education status and family history. **Materials and methods:** Data was collected retrospectively, from the parents of 352 cerebral palsy children admitted/attended to Rani Chandramani Devi Government Hospital, Visakhapatnam, from 2014-2020. **Results:** The data collected from the parents of 352 Cerebral palsy children was analysed age wise. Out of 352 Cerebral palsy children, CP was more prevalent in males 224 (64%). Regarding mother age at the time of conception, mothers of age 18 years and below were 130 (38%), 207 mothers were in between 19 – 30 years (58%), and 15 mothers were above 30 years (4%). Regarding the education status, most of the mothers studied 10th standard 236 (67%). Out of 352 children, family history of Cerebral palsy child was present in 57 cases (16%) and out of which 23 cases of maternal side (6%) and 34 cases of paternal side (10%). **Conclusion:** Regular antenatal check up from the beginning of the pregnancy, focussing specifically on mothers with high risk factors making use of all recent advances for monitoring to identify any deviation of maternal health or deficiencies of growing foetus. Appropriate, timely interventions for the problems which are accessible to treatment should ensure a normal pregnancy with delivery of a healthy baby from a healthy mother.

Keywords: Sex incidence, Mother age, Mother Education, Mother at age conception, Family history,Cerebral palsy..

Introduction

Cerebral palsy is a musculoskeletal illness that causes movement problems owing to injury to the developing brain. The damage to the brain is permanent and non-progressive. Various demographic factors have an impact on the mother's health and the growth of the foetus , resulting in a healthy or poor outcome depending on how the pregnancy is managed. It has been shown that 10% of the global population suffers from some sort of disability due to various reasons; in India, this figure is 3.8 percent of the population. Cerebral Palsy affects approximately 15-20% of physically challenged children. In India, the incidence is estimated to be around 3/1000 live births. The most prevalent motor disability in children is cerebral palsy. Cerebral palsy has been a common concern in India due to the evolving nature of Indian health care in semi-urban and rural areas, as well as the lack of technology in these places. Cerebral palsy is caused by injuries to a baby's developing brain that occur before, during, or after birth. There is no single cause of cerebral palsy. The origin of cerebral palsy in many children is unknown, however various risk factors have been identified [1]. The risk factors are preterm birth, during the neonatal period (birth to one month of life) include prolonged loss of oxygen during birth; brain injury; strokes or seizures; disorders of the heart, blood vessels, airways, and lungs; prolonged mechanical assistance for breathing; some infections; jaundice (yellow discolouration of the skin and eyes due to excess bilirubin in the blood); and some syndromes or abnormalities of chromosomes (structures that hold genes), maternal factors like maternal age, health, diet, socio-economic status, maternal height etc. Continuous, systematic, population-based surveillance is required to monitor the prevalence of CP and determine whether changes in risk factors (such as birth weight distribution, number of multiple births, maternal factors such as maternal age, maternal health status, socio-economic factors, and so on) affect the prevalence of CP over time. The surveillance aids in determining what services affected children and their families require. Studies of functioning can help clinicians and other service providers develop more coordinated, holistic care [2]. Descriptions of the frequency of CP subtypes in the population may also yield clues about aetiology, and studies of functioning can help clinicians and other service providers develop more coordinated, holistic care. The present study was mainly intended to know certain demographic factors like Sex affected, Maternal age at the time of conception of the affected child, Mother education status, and Family history which will have either isolated or cumulative influence on the pregnancy outcome.

Materials and Methods

Demographic data was collected from the parents of 352 Cerebral palsy children attended to / admitted in Rani Chandramani Devi Government hospital, Visakhapatnam and Rehabilitation centre, PedaWaltair, Visakhapatnam, Andhra Pradesh, from 2014 to 2020 was analysed retrospectively. The analysis of demographic data from

**Correspondence*
Dr.Tatavarti Srinivasa Rao
Associate Professor, Department of Orthopaedics, Andhra Medical College, Visakhapatnam, Andhra Pradesh, India.
E-mail: tsrsgc@gmail.com

the case records included sex affected, maternal age at the time of conception of the affected child, mother education status, and family history which will have either isolated or cumulative influence on the pregnancy outcome. A paediatrician who is specialized in child neurology had diagnosed all the cases in the present study. Cerebral palsy was diagnosed as a primary or secondary diagnosis using the International Classification of Diseases, 9th revision (codes 343.0-3 and 8-9) or the International Classification of Diseases, 10th revision (codes 343.0-3 and 8-9) systems (codes G.80.0-9). The data was statistically represented as a percentage.

Results

Data collected from parents of 352 Cerebral palsy children were analysed retrospectively, out of 352 Cerebral palsy children, 224 were males (64%) and 128 were females (36%) (Figure 1). Regarding mother age at the time of conception, 17 mothers were of 15years age (5%), 27 mothers were of 16 years (8%), 38 mothers are of 17 years (11%), 48 mothers are of 18 years (14%), 132 mothers are between 19 – 30 years(58%): 36 mothers are of 19 years age (10%), 39 mothers are of 20 years (11%), 132 mother are between 21 – 30 age group and 15 mothers are above 30 years (4%) (Figure 2). Regarding the education status, 20 mothers have no education (6%), 236 mothers studied up to 10th standard (67%), 60 mothers studied up to 12th standard (17%), 27 mothers studied up to degree level (8%) and 9 mothers are post graduates (2%) (Figure 3). Out of 352 children, ,family history of Cerebral palsy child was present in 57 cases (16%) from which 23 cases of maternal side and 34 cases of paternal side (Figure 4).

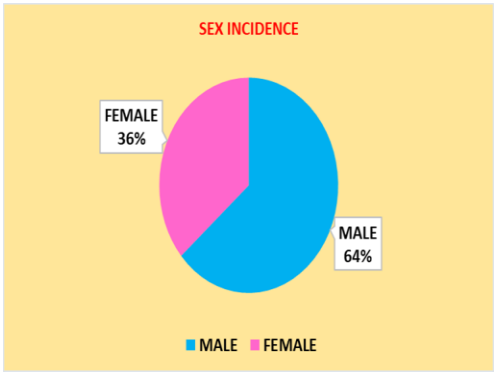

Fig 1: Sex incidence in CP children

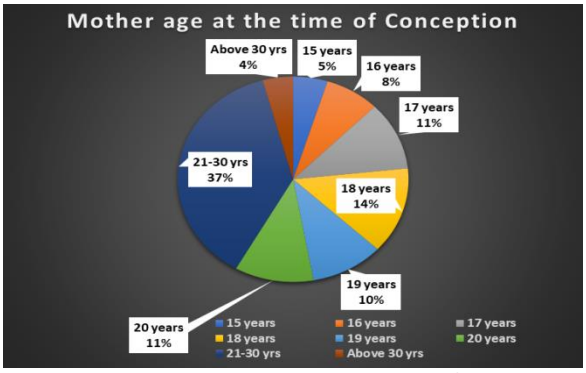

Fig 2: Mother age at the time of Conception

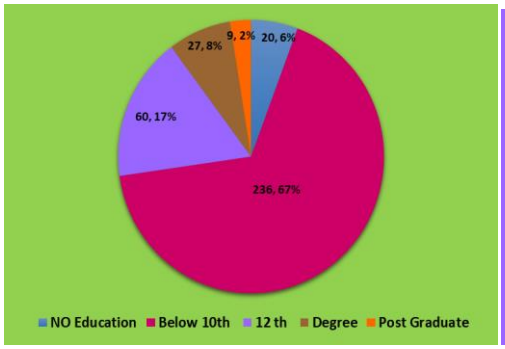

Fig 3: Mother education in CP incidence

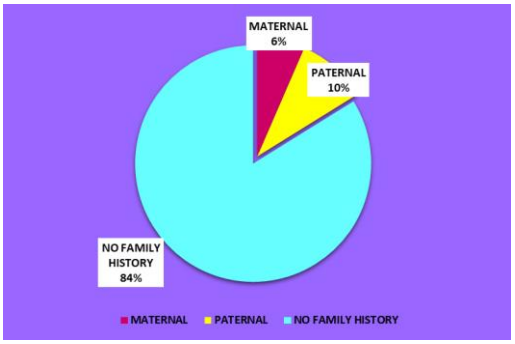

Fig 4: Family history of CP

Discussion

Cerebral palsy is a musculoskeletal illness that causes movement problems owing to injury to the developing brain. The damage to the brain is permanent and non-progressive. Because the musculoskeletal system grows with age, the symptoms of brain damage progress. Even brain injuries are not all the same [3]. Muscle tone abnormalities, disturbances in balance and motor control, and musculoskeletal deformities are all symptoms of brain damage. The effects of brain injury last a lifetime.In our study, 352 Cerebral palsy children, 224 were males (64%) and 128 were females (36 %). Many studies have shown that, the incidence of cerebral palsy is more common in males than females. In a study by Tioseco et al[3] on 833 infants, developmental problems like Attention deficit hyperactivity disorder, Cerebral palsy, Autism, mental retardation, Intra ventricular Haemorrhages and death are more common in males because of gene mutations are more in male infants [3]. The mechanisms for the differential vulnerability of the brain of the male and female foetus is not clear. Females at all ages have low mortality from respiratory problems than males indicating that females might be more resistant to hypoxia [4]. Possible protective effects of the oestrogen and progesterone may be a cause for less occurrence of Cerebral palsy in females. In the study by Hoffman et al. [5] the authors showed that in traumatic brain injury cases, progesterone plays neuroprotective role against brain damage. In a study by Lamari et al [6], the authors showed that, in bilateral spastic cases of cerebral palsy, the results after conservative and operative treatment are better in females than males with regard to walking abilities and limb deformities. In a study by Zhu et al. [7], the authors showed that the CNS is more resistant to Hypoxic ischemic damage in adult females when compared to males,Early marriage below 18 years of age is prevalent in many countries. The reasons for early marriage could be cultural, traditional, religious, social or economic factors. Psychological and physical immaturity of women below the age of 18 leads to health problems to the mother and the growing foetus. Women of very younger age may not be able to appreciate the importance of nutrition on her health and the growing foetus, importance of regular antenatal check-up, identifying and taking prompt treatment for uro-genitary infections and other health problems if any. Very younger

age pregnancies may also lead to prolongedlabor due to Cephalo-Pelvic disproportions , Anaemia due to malnutrition, Intra Uterine Growth Retardation (IUGR). In our study, Mothers of age 18 and below are 130, contributing to nearly 37%, which is a considerable number. In a research article published by Pintu [8], the author made a comprehensive analysis of the impact of early marriage on women's pregnancy outcomes using the more recent nationally representative database. The author's analysis clearly suggest that, women who got married at the age of ≤ 14 years are likely to have stillbirth, miscarriage or wasted pregnancy, pregnancy complications, and post-natal complication than the women who married at age of 18 years or above. In an article published by Olaide et al [9] the authors expressed their deep concern regarding the the practice of child marriage in Nigeria that is deeply entrenched in tradition, culture and religion and that the country has one of the highest rates of child marriage in the world. As per the authors report, 42% of girls are getting married before 18 years. The findings of the author in their study is that, more than 60% had only primary education while more than 70% had experienced complications before or after childbirth.

With respect to pregnancy in older age, problems can arise to both the mother as well as the foetus. As per definition**,** Women having their first pregnancy at or above the age of 30 years (FIGO-35 years) are called elderly primigravidae [10]. The problems with elderly primi during pregnancy are, high chances of abortion, hypertension during pregnancy, bleeding during pregnancy due to placental abruption or placenta praevia, gestational diabetes, Intra Uterine Growth Retardation [10]. During delivery, they can have problems like preterm labor, prolonged labor due to uterine inertia, increased chances of operative delivery and Post-partum haemorrhage due to Uterine atony [10]. After delivery they may have lactational failure. The foetal problems associated with elderly primi are Intra Uterine Growth Retardation (IUGR) and congenital anomalies. In our study, 15 mothers are above 30 years (4%). In a Prospective hospital based study done in 100 elderly primigravida by Vibha Moses and Nilesh Dalal [11], the authors concluded that, PPH, induction of labour , cervical dystocia were found significantly more and vaginal deliveries were significantly less in elderly primigravida. Foetal pregnancy outcomes such as, Oligohydramnios, Breach and Transverse lie, Intra Uterine Growth Retardation and low birth weight were found significantly more in elderly primigravida. In an article by Ojule et al. [12], the authors have compared the pregnancy outcome between elderly primigravida with that of younger primigravida and concluded that, the elderly primigravida are at increased risk of preterm, macrosomia, and caesarean section deliveries compared to their younger primigravida counterparts.

Education is important for everyone, more so for women. In general, education apart from other benefits to an individual, it helps in self-care, also helps in taking care of ones own family members and helps in educating others. This is more so in case of pregnant women. An educated pregnant woman will have self drive for regular antenatal check-ups, can understand the instructions given by a doctor or any health worker, will take the nutritious food for the sake of her health and the growing foetus, will have drive for institutional supervised delivery etc. Health education should be given to all pregnant women regarding antenatal, intra natal, and post natal care. In a study by Anna et al.[13], the authors showed that, when compared to low educated mothers, mothers having higher education status will have reduced preterm births, Low birth weight babies, Small for gestational age, and respiratory distress. In a study by Lindsay et al[14], the authors concluded that, low educational status in a mother is associated with low foetal growth in general. The negative impact of low education of mothers was greatest on head circumference than other body parts. In a cross sectional study conducted by Parveen et al.[15], the authors have given a questionnaire regarding certain health issues of pregnancy. They have selected Five hundred and eighty one parous women for the study. They found that, the women in the study have got knowledge about dietary intake of essential foods like dairy products , Protein-rich foods , fruits, the hours of daily rest necessary, the need for exercise, the importance and timing of antenatal visits, the risk of smoking in pregnancy, and proper spacing of babies. However, many women had no knowledge of the importance of taking high fibre foods to avoid constipation, the required dietary changes in early pregnancy to prevent nausea and vomiting, the ill-effects of maternal smoking on the foetus, Rubella infection and advancing maternal age on the foetus, various antenatal procedures such as blood examination, breast-care during pregnancy and immunizations to prevent Tetanus and Rubella infection [16].

In an article by Stephanie et al. [17] the authors aimed at better understanding of expectant parents' perception of importance regarding a wide range of prenatal education topics, their information delivery method preferences. Most of the participants rated each item on the Perceived Importance of Topics survey as "important" or "very important." Overall, the topics of new born Safety, Birth, and Breastfeeding had the highest percentage of participants who indicated the topic was "very important." Most of the respondents) indicated that their preference was to attend face-to-face-prenatal education sessions.Studies have showed that, history of cerebral palsy in the family increases the risk of Cerebral palsy. Cerebral Palsy is not a hereditary condition, but researchers have shown that hereditary factors can predispose to Cerebral Palsy. Though no specific genetic disorder can directly cause Cerebral Palsy, genetic influences can show influences on many genes. Genetic influences can also cause gene-to-gene interactions influenced by environmental factors which is known as complex inheritance or Multifactorial inheritance. In our study there is a family history of cerebral palsy in 16% of the cases out of 352. Of the 16%, 6% is from Maternal side and 10% is from Paternal side.Multiple risk factors may lead to the increased risk of recurrence of cerebral palsy in families [18]. Intrinsic and maternal risk factors should be investigated in all cases of cerebral palsy to properly counsel families on the risk of recurrence [18]. Alastair et al. [18] opined that, the great likelihood is that, with exception of uncommon causes in infancy, the pathways to the neuropathology of CP usually begin well before delivery and often in earlier pregnancy. The authors emphasize the importance of considering the possible genetic causes that may directly, or through genetic susceptibility, trigger different pathways to different neuro pathologies that share the common clinical trait of a nonprogressive movement disorder diagnosed as CP [19]. In a study by Sherlly et al. [19] the study showed that the family history of mental and neurological disorders is associated with increased risk of Autism Spectrum Disorders(ASD). The familial component of ASD aetiology may differ by presence or absence of co-occurring Intellectual Disability(ID) [19].

Conclusion

From our study, the authors conclude that, male sex is more vulnerable to the various mechanisms which can cause brain damage leading to cerebral palsy. Pregnancy in women below 18 years and above 30 years leads to maternal and foetal problems, both extremes should be dealt with caution. Maternal education is cost effective, multi directional, multilevel tool in preventing or minimising the maternal and foetal problems of pregnancy. It will improve overall outcome of the pregnancies. Regular antenatal check up from the beginning of the pregnancy, with a specific attention on mothers with associated high risk mothers by making use of advanced technology for monitoring both mother and the foetus will help in early identification of any deviation of mother health or any deficiency of growing foetus. Appropriate and timely interventions for the problems which are accessible to treatment should ensure a normal pregnancy with delivery of a healthy baby from a healthy mother.

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