

# Prevalence of Cerebral Palsy in Children Born after in Vitro Fertilisation: A Retrospective Study

Trupti Sapate<sup>1</sup>, Dr. Gargi Bhalekar<sup>2</sup>  
Intern<sup>1</sup>, Professor & HOD Neurophysiotherapy<sup>2</sup>  
L.S.F.P.E.F's College of Physiotherapy Nigdi,  
Pune India

**Abstract:-** In vitro fertilisation (IVF) is a procedure an egg are removed from women's ovaries combined with sperm outside of body to form embryo. Cerebral palsy [CP] is a congenital non progressive disorder of movement, muscle tone, posture. CP is due to abnormal brain development or malformation that occurs while the Childs brain is under development. This study will help to find occurrence of cerebral palsy in children born after IVF. This study is observational study.

**Objective:** To Find the prevalence of cerebral palsy in children born after IVF in full term and preterm delivery.

**Result:** The sample size 86 from which 55 are preterm born higher prevalence of cerebral palsy in children born after IVF.

**Conclusion:** The study concludes that there is prevalence of cerebral palsy in children born after in vitro fertilisation.

**Keywords:-** Children born after IVF, Cerebral palsy, full term delivery, preterm delivery.

## I. INTRODUCTION

IVF is used to assist a woman in becoming pregnant. Since its dramatic introduction in 1978, in vitro fertilisation, often known as IVF, has captivated the public's attention.<sup>1</sup> Many infertile couples' hopes of having children have come true thanks to assisted reproductive technology (ART). Infertility-related morbidity has decreased significantly as a result of its continuous growth.<sup>2</sup> ART procedures, such as IVF and intracytoplasmic sperm injection (ICSI), are generally characterised as fertility therapies in which both the egg and sperm are managed in the laboratory.<sup>3</sup> Infertile and subfertile couples are increasingly seeking aid to conceive via artificial treatments such as in vitro fertilisation (IVF) or intracytoplasmic sperm injection (ICSI). Fresh IVF cycles typically begin with the injection of a follicle-stimulating hormone to encourage follicle growth, followed by the infusion of human chorionic gonadotropins to trigger the oocyte's ultimate maturation. Oocytes are picked up and insemination and fertilisation are done in vitro between 32 to 48 hours of the injection.<sup>3,4</sup> Despite the fact that ART methods became more widely employed in recent decades, there is still concern regarding the health of the growing number of IVF/ICSI offspring. Because empirical evidence is variable, it should be carefully reviewed.<sup>4,5</sup> Genetic diseases, congenital deformities, premature delivery, low birth weight and perinatal issues, developmental delays and

impairments, and behavioural and mental health concerns were all mentioned in certain studies as potential problems for these children.<sup>5</sup> Various techniques in assisted reproductive technology (ART) have been developed as solutions for specific infertility problems. It is important to gain consensual conclusions on the actual risks of neuro developmental disorders among children who are born from ivf.<sup>6</sup> Cerebral palsy, or more accurately, the cerebral palsies are a group of motor disorders caused by damage or mal development of the brain that occurs prenatally, peri-natally or postnatally. Although the lesion is non-progressive, since the brain and nervous system develop in the presence of the lesion, the clinical picture of disordered movement and posture will change as the child gets older. Despite its name the cerebral palsies present not only 'palsies', or motor problems, but many other problems in these children. Cerebral palsy (CP) is a neurological disorder that affects movement, muscle tone, and posture. The underlying aetiology is injury to the developing brain during the prenatal to neonatal era. Despite the fact that the basic neuropathologic lesion is not progressive, children with CP can develop a range of secondary disorders that impair their functional abilities in various ways throughout time.<sup>10</sup>

## II. NEED OF STUDY

IVF stands for in vitro fertilisation it is an artificial reproductive technique so women who get IVF treatment are more likely to have serious pregnancy problems. Due to sedentary lifestyle many couples have problems which leads to infertility and couples moves to invitro fertilization It's essential to reach a consensus on the true risks of cerebral palsy in these children Multiple pregnancies' hazards, as well as congenital deformities, have already been thoroughly discussed. On the other hand, there have been fewer research on cerebral palsy among ivf children. The nature of certain neurodevelopmental disorders that may not manifest until later in a child's life, difficulties in obtaining long-term follow-up, and the fact that many disorders can only be diagnosed and treated in a multidisciplinary manner are all possible reasons for the limited number of studies on neuro developmental outcomes in these children. There are no research done in India of prevalence of cerebral palsy in children with IVF.

- **Aim:** The aim was to assess the prevalence of cerebral palsy among children conceived with in vitro fertilization.
- **Objective:** To find the Prevalence of cerebral palsy among children born after in vitro fertilization in preterm delivery and full term delivery.

### III. METHODOLOGY

- Type of study- Observational study
- Sampling technique- Purposive sampling
- Sample size- 86
- Study area- PCMC
- Study duration- 6months
- Study material- pen, notepad

#### A. Inclusion Criteria

Child born through invitro fertilization

Preterm invitro fertilization (before 37 weeks)

Fullterm invitro fertilization(38 week-42 week)

#### B. Exclusion Criteria

Other neurological conditions-spina bifida neonatal sepsis Autism

Attention deficit hyperactivity disorder (ADHD)

#### C. Procedure

Ethical approval was taken

Subjects are chosen according to inclusion and exclusion criteria.

Data was collected from the hospital (3 years)

Naturally conceived and IVF born.

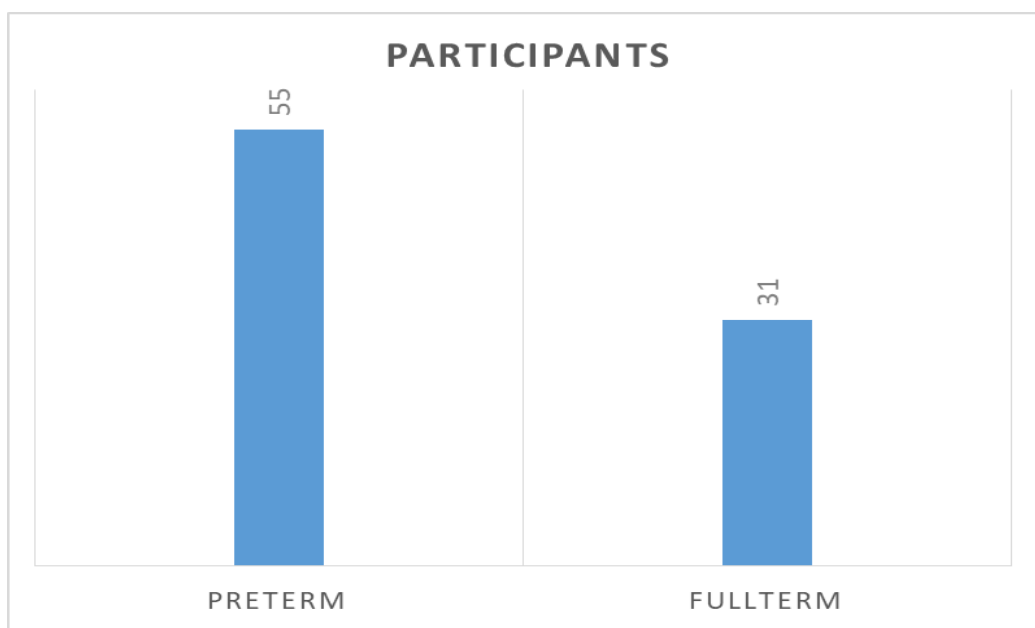
According to inclusion criteria IVF children were taken.

IVF children were then divided in preterm and full term delivery.

Children diagnosed with cerebral palsy by paediatrician were further analysed.

### IV. DATA ANALYSIS AND INTERPRETATION

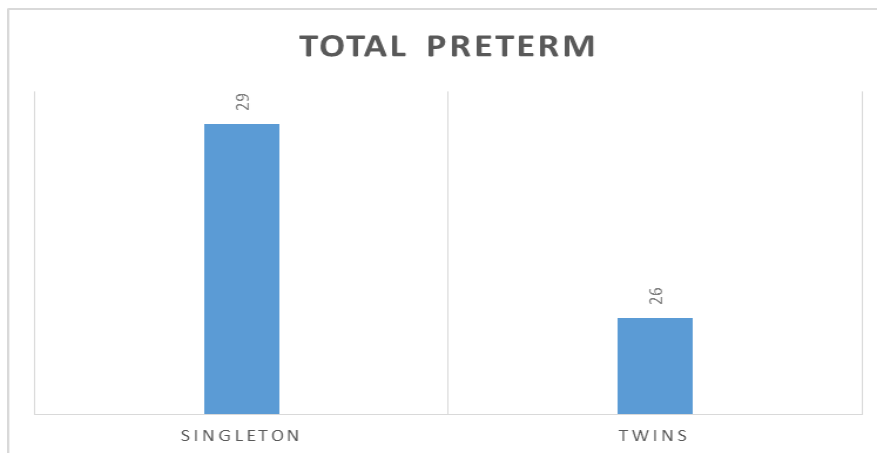
Preterm	55
Full term	31
Total	86



Graph 1: Shows total babies born in full term and preterm

- **Interpretation:** There are total 86 children born from which 31 are full term and 55 are preterm Graph 2 shows total preterm born singleton and twins.

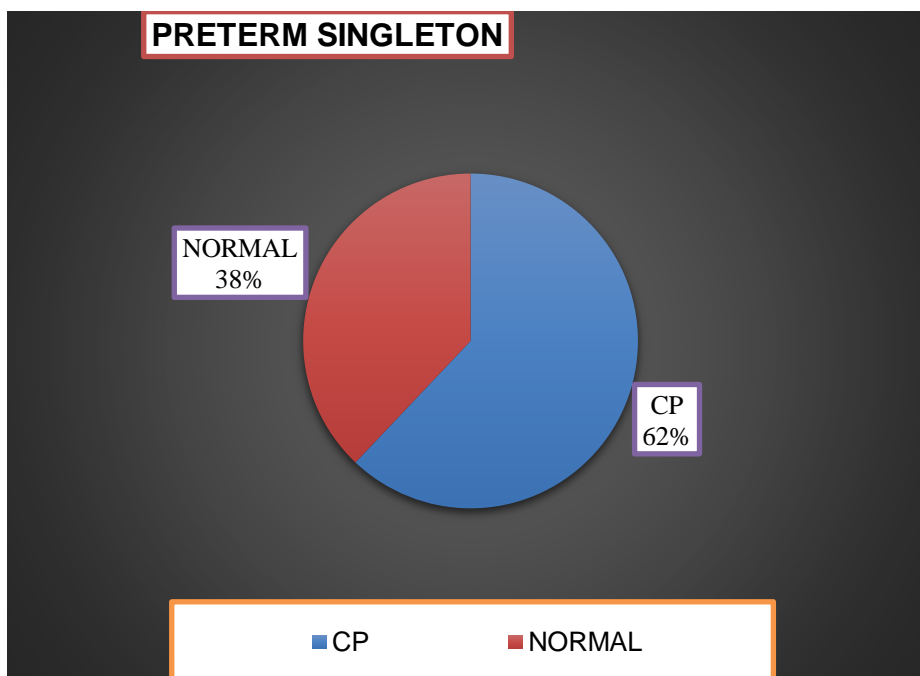
Singleton total	29
Twins	26
Total preterm	55



Graph 2: Shows total Preterm

**Interpretation:** There are total 55 preterm born from which 29 are singleton and 26 are twins.

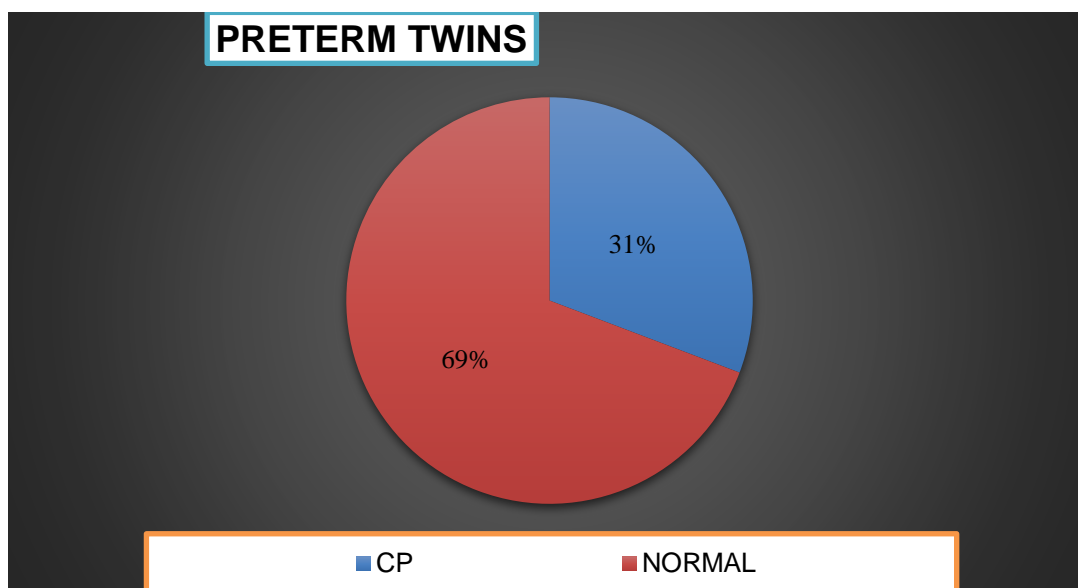
Singleton total	29	100%
CP	18	62%
Normal	11	38%



Graph 3: Shows preterm born cerebral palsy

• **Interpretation:** This graph shows there are total 29 singleton born. There are 18 cerebral palsy (62%) and 11 are normal (38%)  
 Graph 4 shows preterm cerebral palsy and normal born

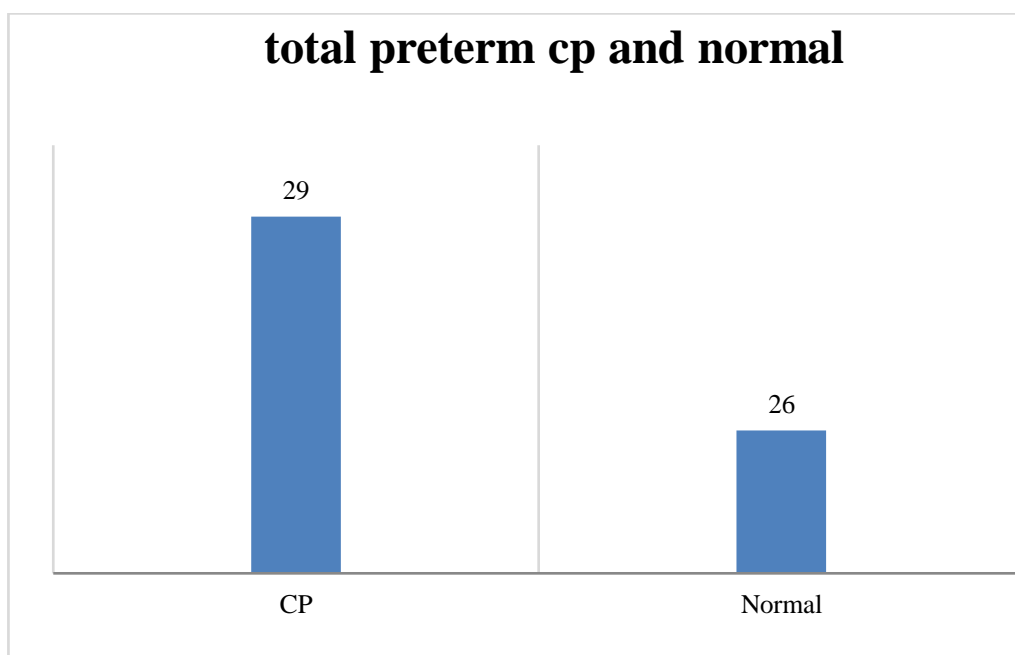
Total twins	26	100%
CP	8	31%
Normal	18	69%



Graph 4: Shows preterm Twins

• **Interpretation:** The graph shows preterm born are 26 from with cerebral palsy are 8 (31%) and normal are 18(69%).

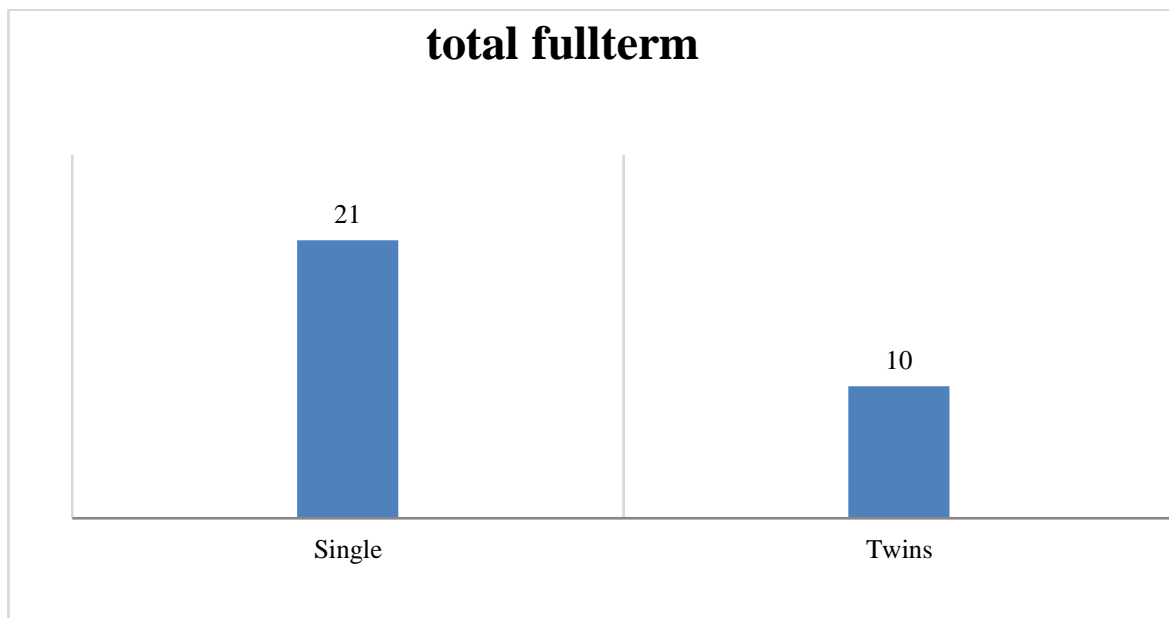
CP	29
Normal	26
total preterm	55



Graph 5: Shows total preterm with cerebral palsy

• **Interpretation:** This graph shows normal are 26 and cerebral palsy are 29

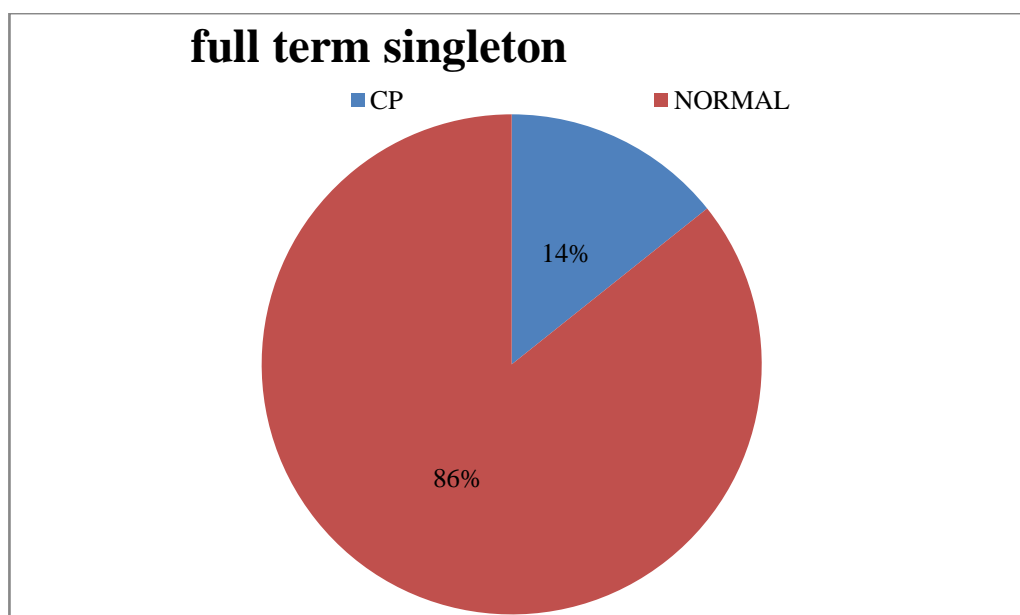
Single	21
Twins	10
Total fullterm	31



Graph 6: Shows total full term singleton and twins

• **Interpretation:** This graph shows 21 singleton born from which 3 are CP and 18 born are normal.

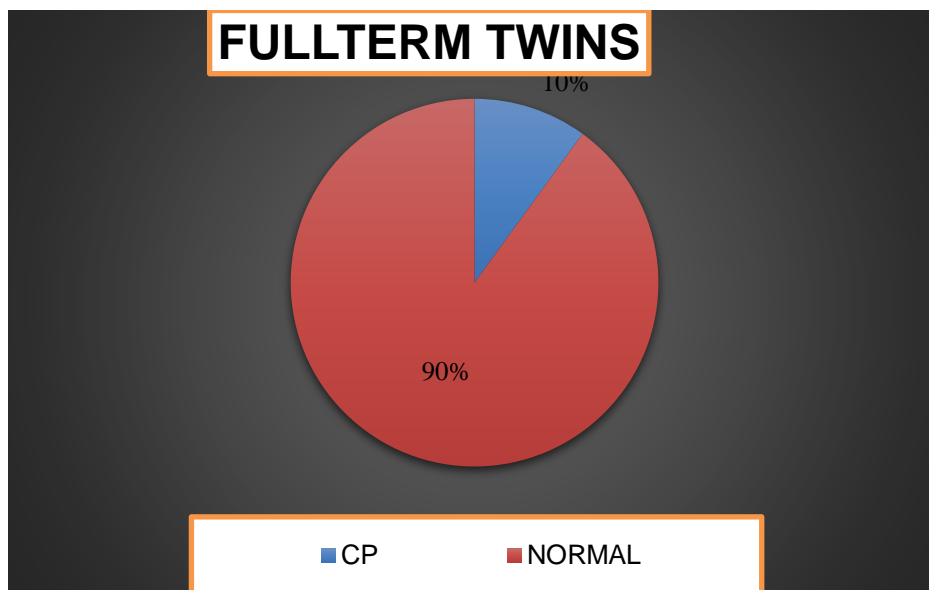
Fullterm singleton	21	100%
CP	3	14%
Normal	18	86%



Graph 7: Shows full term singleton with cerebral palsy

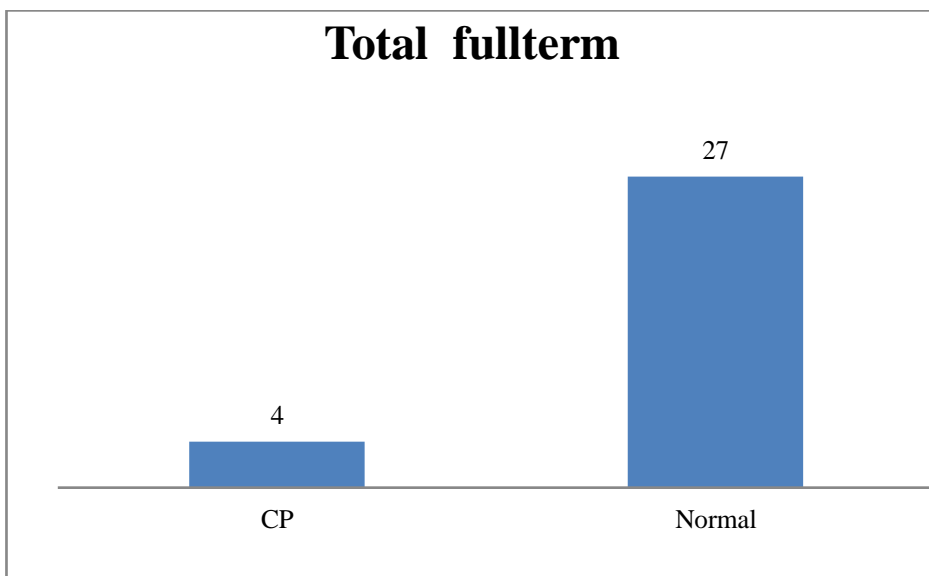
• **Interpretation:** This graph shows 21 singleton born from which 3 are CP and 18 born are normal.

Twins total	10
CP	1
Normal	9



Graph 8: Shows full term Twins

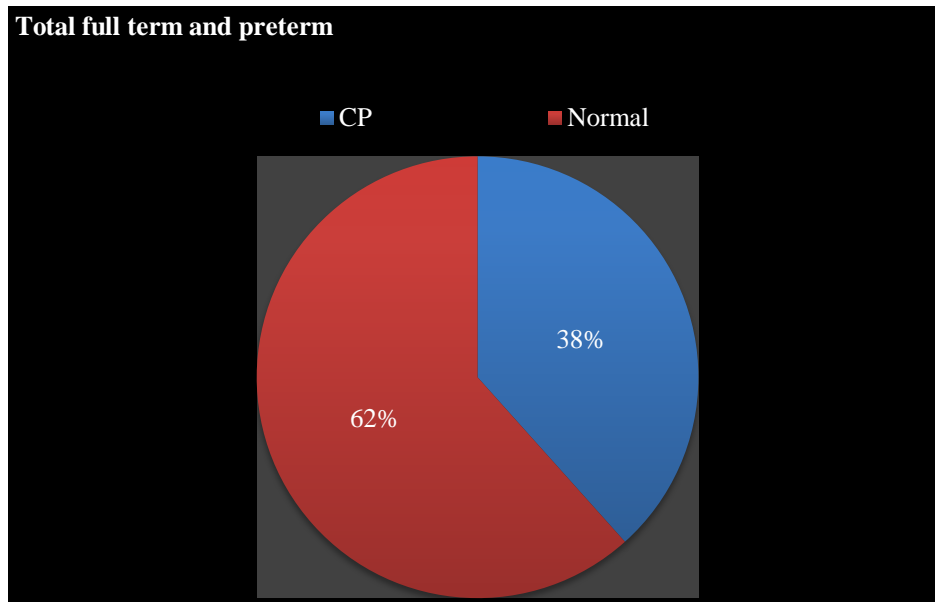
- **Interpretation:** This graph shows 10 twins born, 9 are normal born and 1 cerebral palsy.



Graph 9: Shows full term with cerebral palsy

- **Interpretation:** This graph shows 31 total full term 27 are normal, and 4 are CP.

CP	39
Normal	47
total	86



Graph 10: Shows total cerebral palsy in full term and preterm

- **Interpretation:** This graph shows there are total 86 born , from which 47 are normal and 39 are CP.

**V. RESULT**

- Graph 1 shows that there are total 86 children born from which 31 are full term and 55 are preterm .
- Graph 2 shows that there are total 55 preterm born from which 29 are singleton and 26 are twins.
- Graph 3 shows that this graph shows there are total 29 singleton born. There are 18 cerebral palsy (62%) and 11 are normal (38%).
- Graph 4 shows that the graph shows preterm born are 26 from with cerebral palsy are 8 (31%) and normal are 18(69%).
- Graph 5 shows that normal are 26 and cerebral palsy are 29 born
- Graph 6 shows 21 singleton born from which 3 are CP and 18 born are normal
- Graph 7 shows that 21 singleton born from which 3 are CP and 18 born are normal
- Graph 8 Graph 9 shows 31 total full term 27 are normal, and 4 are CP
- Graph 10 shows there are total 86 born , from w hich 47 are normal and 39 are CP

**VI. DISCUSSION**

Cerebral palsy(CP) represents a group of disorders that result from damage to immature brain, with permanent motor disorder and frequently impaired mental development.<sup>1</sup>Invitro fertilization results in large proportion of multiple birth. It is possible that the risk of CP is increased after invitro fertilization because of high proportion of multiple birth and preterm delivery.<sup>11</sup>

In this study there are 86 children born with IVF from which 55 were preterm and 31 were full term. Preterm born were 55 from 29 are singleton and 26 are twins. The reason for preterm twins is transferring multiple embryo into the mother was common in past and is often used today. Today there is drop in twins because of single embryo transfer. The drop in twins born through IVF parallels the drop of CP in twins than singleton.<sup>22</sup>

In this study the risk of CP for IVF children was lower than than the risk found by Stomberg et al <sup>11</sup>but in accordance with their findings, the population was more than in this study, the risk attributable to IVF increased preterm delivery. Lidegaard et al<sup>12</sup> found similar result as this study. He reviewed using slightly different Danish cohort for their study (1995-2001) compared with 1995-2000 found stastically significant increase risk for CP among IVF singletons was higher in larger population.

In study more IVF singleton are born preterm and full term delivery. Subfertility has been associated with preterm delivery and could be vanishing embryo syndrome. In IVF commonly >2 embryos are transferred which produces potential risk of losing a twin or triplet in early pregnancy. Pinborg A, found that an increased risk of preterm delivery and low birth weight among IVF children born after vanishing of co-embryo<sup>13</sup>

An association between CP and IVF pregnancies in which the embryos transferred originally was higher than the number of infants of delivery was indicated. Like other studies by Pinborg et al<sup>13</sup> and Stromberg et al<sup>5</sup> found that no difference in risk of CP between IVF twins and other twins.

Approximately 39% of CP among IVF children in full term and preterm delivery born, which underscores the importance of minimizing the number of children born in preterm with IVF in present study. More wide spread use of single embryo transfer might reduce the problem and prevent some of adverse outcomes associated with multiple and preterm birth. Evidence regarding pregnancy rates and neonatal outcomes after transfers of >1 embryo is still limited.<sup>14</sup> but studies from Finland and Sweden, where single embryo transfer is used to greater extent than in many countries shows high pregnancy rates with single embryo transfer.

In a study singleton were study separately in preterm there are 29 singleton from which there are 18 cerebral palsy and 11 are normal. The risk for cerebral palsy was still doubled but not significantly increased. After adjusting for low gestational age, sex, and mother age, IVF increased risk on its own. Singletons had the similar tendency of twins, however the results were not significant. These results could imply that the risk of Cerebral palsy is increased after IVF, irrespective of twinning or premature birth<sup>5</sup>

In study full term are 31 born twins are 10 and 21 are singleton from which 27 are normal and 4 are CP. In this study full term cerebral palsy is at risk as the baby is of normal birth weight and single embryo is transferred. A study shows full term has risk of CP but a study was done by Helmerhorset 2005 reviewed that IVF children twins have increased risk of CP due to low birth weight and perinatal mortality compared to preterm birth with IVF and a study has similar result shows that there is low risk of CP a population based Swedish study was done reviewed by Stromberg et al, he found decreased risk of cerebral palsy after IVF in full term delivery.<sup>5</sup> a full term study was done on large cohort of prospectively followed children, they found no significant association between time to pregnancy and the risk of CP in children conceived spontaneously, whereas children born after IVF or ICSI had an increased risk of CP.<sup>15</sup>

## VII. CONCLUSION

The study concludes that there is a prevalence of cerebral palsy in children born after invitro fertilization.

- **Limitation:-** There are less institutes of invitro fertilization and permission for information at all institutes is not available
- **Future Scope Of Study:-** The study can be done in comparison of singleton and twins born invitro fertilization. The study can be done on types of CP in children.

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