A COMPARATIVE STUDY OF PERINATAL MORBIDITY AND MORTALITY OF PRESENTING TWIN TO ITS CO-TWIN

DISSERTATION SUBMITTED FOR

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CHENNAI, TAMILNADU

CERTIFICATE FROM DEAN

This is to certify that the dissertation entitiled **" A COMPARATIVE STUDY OF PERINATAL MORBIDITY AND MORTALITY OF PRESENTING TWIN TO ITS CO-TWIN"** is the bonafide work of **DR.C.PREETHI JENNIFER**, in partial fulfilment of university regulation of the Tamil Nadu Dr M.G.R. Medical University, Chennai, **M.S Branch II OBSTETRICS AND GYNAECOLOGY** examination to be held in April 2015.

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BONAFIDE CERTIFICATE

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DECLARATION

I , **Dr . PREETHI JENNIFER . C** solemnly declare that the dissertation titled **" A COMPARATIVE STUDY OF PERINATAL MORBIDITY AND MORTALITY OF PRESENTING TWIN TO ITS CO-TWIN "** has been prepared by me . I also declare that this bonafide work or a part of this work was not submitted by me or any award , degree , diploma to any other University board either in India or abroad.

This is submitted to The Tamilnadu Dr . M .G .R Medical University , Chennai in partial fulfillment of the rules and regulation for the award of M.S **BRANCH-II (Obstetrics and Gynaecology**) to be held in April 2015.

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CONTENTS

INTRODUCTION

The incidence of multiple gestation in India is increasing it is 9-16 per thousand. Second-born twins are widely believed to be at a disadvantage. Compared to first-born twins,so many studies have shown that twin B is more likely to have lower Apgar scores, less favorable umbilical arterial or venous parameters, a higher incidence of intraventricular hemorrhage and respiratory distress syndrome ,a higher perinatal mortality, and a higher need for intubation. The disadvantage of twin B was attributed to differences in gender, birth weight, presentation, mode of delivery, time interval between births, birth trauma, operative delivery, placental separation, cord prolapse, asphyxia (which increases the potential for intraventricular hemorrhage and decreases surfactant production, thus increasing respiratory distress,) chorionicity and undiagnosed twins. Some authors have suggested that the increased risk for twin B is limited to nonvertex second twin, to infants <1500 g at birth, or to multiparas. Lawgained the impression that “some factor or factors, the nature of which was not apparent, may be present and operating to the detriment of the second infant.” This sounds like an echo of Hendricks' dictum that the hazards for a twin fetus are more biologic than obstetric. Such a gloomy outlook for the nonpresenting twin was refuted by several studies that showed no difference in

perinatal mortality, Apgar score at 5 minutes, incidence or severity of intraventricular hemorrhage or incidence of other neonatal complications. We conducted our study to compare twin A to twin B in the era of sonography, fetal monitoring, judicious use of inducing agents, and increased cesarean delivery rate.

REVIEW OF LITERATURE

History:

Twin personalities are seen in myths of ancient Greek, Roman and Indian Culture the sons of Mars, Romulus and Remus, Lava and Kusha of Ramayana. Hippocrates explained the existence of Mono-chorionic twins. Viadrel first described twins in 1895. Hellin described the mathematical relationship between twins. (The natural course of monochorionic and dichorionic twin; a historical cohort, 2006)

Incidence:

The incidence of multiple pregnancies is increasing over past 30 years. This is due to the advances in reproductive medicine, increase in maternal age. Twins occur in 1 of 80 pregnancies, contributing to 2.8% of all newborn, 12.4% of preterm birth 15.1% of perinatal death. The induvidual twin's risk of prenatal death is thrice compared to singleton. Low birth weight, prematurity, malpresentation, hazards of delivery are the reasons, hence twin pregnancy is considered high risk [49]

Multiple pregnancy is described by the development of more than one fetus inside the uterus. Based on number of fetuses they are named twin,

triplet, quadruplet, quintuplet, etc., Mechanism of development of twin pregnancy is quite interesting

In superfetation, an interval as long as or longer than a menstrual cycle intervenes between fertilizations.

In superfecundation fertilization of two ova within the same menstrual cycle but not at the same coitus, not necessarily by sperm from same male.

Dizygotic twins / Fraternal twins:

They result from simultaneous ovulation of two oocytes and fertilization by different spermatozoa. They vary in genetic constitution.

Maternal age, parity, ethinicity, race, weight, socio-economic class have an impact on dizygotic twins.

Monozygotic twins / Identical twins:

It occur 1 in 250 pregnancies. Depending on the division of primary zygote at varying developmental stages there are three types of monozygotic twins:

a) Dichorionic Diamniotic:

- Zygote divides within 72 hours after fertilization.

- develops before the differentiation of chorion and amnion, hence has two chorions and two amnions.

- There may be two different placentas or single fused placenta.

b) Monochorionic Diamniotic:

- Here the division occurs between the fourth and eighth day.

- The chorion differentiates, so only single chorion develops, but amnion may be two.

- Single placenta

c) Monochorionic Monoamniotic:

- By 8 days after fertilization, chorion and amnion are differentiated already embryonic division occure with common amniotic sac.

- Single placenta

CONJOINED TWINS:

If the division of embryo occurs after 13 days, conjoined twins develop.

Monozygotic twins are independent of maternal age, parity, nutritional status and environmental factors.

Occurence of monozygotic twins is twice as compared to dizygotic twins in cases of ovulation induction and in-vitro fertilization. There is risk of early pregnancy loss and other complication of twins such as twin – twin transfusion syndrome, acardiac twining etc.,

Maternal changes in multiple pregnancy:

Pregnancy is a period during which various changes occur in the maternal body system which makes it favourable for the fetus to develop. These anatomical and physiological changes occur in response to the demands of the fetus.

All maternal system needs to adapt, the timing and degree of adaptation varies from one induvidual to other and among the organ systems. It is essential to understand these changes occurring in pregnancy to anticipate complications and for its prevention.Changes in multiple pregnancy is more than singleton pregnancy, that it becomes borderline pathological. The changes may be divided into Anatomical and physiological.

Anatomical changes:

Uterine size: The size of the uterus is same as singleton until second trimester, then it is twice as big as singleton pregnancy.

1) **Cervical Length:** It is crucial in cases of twin pregnancy. Cervical length shortens by 0.8mm per week, So twin pregnancy is definitely predisposed to preterm birth.

2) **Amniotic Fluid:** The amniotic fluid volume increases till second trimester, stabilises during starting of third trimester, then decreases between 33-36 weeks of gestation. But the normal range of amniotic fluid Index is same as singleton that i.e. 5-25 cm.

3) **Weight Gain:** According to ACOG the average weight gain during twin pregnancy is estimated to be 16.0 to 20 kg which is around 0.68 kg / week. Weight gain below 0.38 kg/ wk is associated with preterm labour. The weight gain occurring in multiple pregnancy if occurs in the early trimester is associated with the prolongation of length of gestation in cases of twin pregnancy and better birth weight of twins [93]

Physiological changes:

I)Circulatory System:

There is increase in demand for oxygen, appearing as early as 5 wks after the Last Menstrual period. This demand causes,

1) 30-40% increase in cardiac output as early as at 10 weeks of gestation.

2) 35% increase in blood volume due to activation of Renin – Angiotensin – aldosterone system and increased levels of placental hormones.

3) Increase in heart rate occurs by 15 – 20% at the end of first and second trimester due to decrease in systemic vascular resistance during pregnancy.

4) There is increase in stroke volume by 25 – 30% at the end of second trimester till term due to increased pre-load.

5) The ejection fraction increases due to increase in left ventricular end diastolic volume but end systolic volume remains unchanged.

6) The uterine perfusion increases by 20-40% compared to singleton pregnancy.

7) As the concentration of progestagens is high in multiple pregnancy there is decrease in systemic vascular resistance resulting in decreased diastolic blood pressure. Systolic blood pressure – Stable.

8) Compression of the vessels such as Aorta, inferior vena cava by overdistended uterus causes supine hypotension syndrome, compensated by increase in maternal heart rate and increased resistance of vessels of lowerlimb[16]

9) RBS mass increases by 20 – 30% maternal iron demand is increased by 500mg.

II. Respiratory systems:

Initially endocrine changes of twin pregnancy cause changes in respiratory system followed by physical and mechanical changes. As uterus enlarges it causes venous compression, elevation of relaxed diaphragm causing,

1) Decrease in functional residual capacity.

2) Increase in inspiratory reserve volume

3) Decrease in total lung capacity residual volume, expiratory reserve volume.

These changes are counter- acted by increase in the antero – posterior and transverse diameter of thoracic cage.

Progesterone causes direct stimulation of respiratory system, leading to hyper-ventilation in case of multiple pregnancy[38]

III. Gastrointestinal system:

1) Increased level of chorionic Gonadotrophin causes the increased frequency of gastric emptying.

2) Increased progesterone causes lowering of lower oesophageal sphincter tone, decreases fat absorption.

3) Pyroris (Heart burn) occurs because of

(a) anatomical pushing of stomach – intra abdominal portion of oesophagus to thorax.

(b) Effect of progesterone.

IV. Renal physiology:

There is increased blood volume and decreased renal artery resistance.

-There is increased glomerular filtration rate indicated by increased creatinine clearance by 50% by the end of first trimester to a peak of around 180 ml/ min.This results in decrease in the levels of creatinine, serum blood urea- nitrogen. That is why serum creatinine greater than 0.8mg is an indicator of underlying renal pathology.

There is decrease in body levels of proteins due to increased GFR. But there is not increase in total sodium due to the renin – angiotensin aldesterone metabolism [74]

V) Hematologic System

Circulating blood volume increases in twin pregnancy to maintain the pre-load and the cardiac output. The increase in red cell mass occurs later in pregnancy. The difference in timing between the increase in red blood cell mass and plasma volume expansion results in physiological fall in hematocrit inspite of the adequate iron stores causing physiological or dilutional anemia of pregnancy until the end of the second trimester.

Erythropoiesis in increased under the influence of increased placental hormones as well as dilutional anemia. This dilution causes decrease in platelet count causing gestational thrombocytopenia,selective bone marrow granulopoiesis, peaks at 30weeks of gestation.

Pregnancy is a hyper-coagulable state. There is increase in factors 12, 10, 9, 7, 8, von willibrand factor and fibrinogen. There is decrease in factor 11. But the levels of factor 2, 5 are unchanged in pregnancy. Protein C and Anti-thrombin-III are increased or unchanged. Protein S levels decrease in pregnancy. All these causes an increased predisposition to thrombosis during pregnancy as well as during puerperium. This hypercoagulable state of pregnancy helps to minimize the blood loss during delivery. This is also a sword of putting mother into risk of thromboembolism[110]

VII) NUTRITIONAL REQUIREMENTS:

Estimated Nutrient Requirements

Nutrient	Dietary Sources	Nonpregnant	Singleton Pregnancy	Twin Pregnancy	Triplet Pregnancy	Quadruplet Pregnancy
Calories	Proteins, fats, and carbohydrates	2,200 kcal	2,500 kcal	3,500 kcal	4,000 kcal	4,500 kcal
Protein (20%)	Meats, seafood, poultry, dairy products	110 g	126 g	176 g	200 g	225 g
Carbohydrate (40%)	Breads, cereals, pasta, dairy, fruits	220 g	248 g	350 g	400 g	450 g
Fat (40%)	Dairy products, nuts, oils	98g	112 g	155 g	178 g	200 g

Complications of Pregnancy:

1)Anemia:

Hemoglobin level below 10 gm % at any stage of pregnancy is considered anemia. The incidence of severe anemia is four times when compared to severe anemia of singleton whereas the incidence of moderate anemia is twice higher than singleton. The reason for anemia is increase in demand by both the fetuses (SA Journal of OG – June 1964)

2) Hypertensive disorders of pregnancy:

Hypertensive disorders of pregnancy are the major complication of multiple pregnancy. They encompass pregnancy induced hypertension, pre-eclampsia, eclampsia. The incidence is 14% in twin pregnancy. These hypertensive disorders increase the risk of pulmonary embolism and stroke which is 3-12 times greater in twin pregnancy. It is associated with high perinatal mortality and morbidity.

Pre-eclampsia is an idiopathic multisystem disorder. This occurs three times more frequent in twin pregnancy compared to singleton pregnancy. The onset of pre-eclampsia occurs very early and HELLP syndrome occurs more frequently in multiple gestation. There is increased risk of IUGR as

well as preterm in case of these hypertensive disorders requiring close and more frequent surveillance of the mother and fetus[9]

3) Hydramnios:

Hydramnios occurs more common in cases of Monochorionic Monoamniotic twin pregnancies and in cases of oligo-poly sequence in Twin – Twin transfusion Syndrome. (Twin pregnancy study of 1000 cases, Farrell 1964)

4) Antepartum Hemorrhage:

Placental abruption is three times more common in twin pregnancy when compared to singleton due to the over distension of the uterus and other important factor is the increased risk of developing pre-eclampsia. It occurs most commonly in third trimester, occurrence is also seen once the first baby has been delivered vaginally. ***(American pregnancy association) (2002)***

4) Gestational Diabetes:

There is increased risk of gestational diabetes in cases of multiple pregnancy because of the presence of two placentas causing increased resistance to insulin, increased levels of placental hormones. The percentage

of incidence, higher when compared to singleton is under further investigation (Multiple pregnancy -American pregnancy association 2008).

5) **Prematurity:** The incidence of preterm birth in twins is 57%. Preterm labour occur in 7% to 12% of all deliveries and it accounts for 85% of perinatal mortality and morbidity. Preterm birth is defined as the increase in frequency and intensity of uterine contractions resulting is the effacement and dilatation causing the delivery of the fetus before 37 completed weeks of gestation.

Identification of High risk women among twin pregnancy:

1. **Fetal fibronectin in cervicovaginal secretions:**

   It is done between 22-34 weeks of gestation, a great marker for preterm birth in singleton pregnancies, but may be of predictive value in twins.

2. **Serial Sonographic measurement of cervical length:**

   Cervical length less than 2.5cm has risk of preterm birth. It has low predictive value in cases of twin pregnancy, but still can be used to take precautionary action.

3. **Cardiotopography:**

Cardiotopography allows the detection of onset of the preterm labour by uterine contraction detection and helps in intervention by tocolysis.

Prevention of preterm birth:

a) Bed rest and hydration are helpful in prevention of initiation of uterine activity.

b) Tocolysis: The main objective of tocolysis is to decrease the uterine contractions and to prolong the period of gestation. The choice of tocolytics is very important because of the risk of pulmonary edema and cardial arrythmias.

c) Cervical Encirclage:

Cerclage placement for multiple gestation is not supported by literature as there are only limited work on it.

d) Antibiotics: There is no role of broad spectrum antibiotics therapy is case of preterm labour with intact membranes.

6) Intrauterine growth Restriction:

Intra-uterine growth restriction occurs more commonly in twin pregnancy when compared with singleton pregnancy. This is the major

cause for perintatal mortality and morbidity. IUGR in multiple pregnancies is radiologic diagnosis that requires the presence of estimated fetal weight < 3rd percentile (2 standard deviations from the mean) for gestational age or EFW < 10th percentile for gestational age with evidence of fetal comprimise such as oligohydraminos and / or abnormal umbilical artery doppler velocimetry. Accurate birth weight is of importance in analyzing IUGR. Singleton and twins have same weight improvement till 28 wks,but after that the twi lags behind,this is due to the crowding of placenta and anomalous umbilical cord insertion. IUGR neonates account for 50% morbidity, even more higher if delivered as preterm. Management and good outcome depends on identifying high risk women, early antepartum diagnosis, identifying the etiology, close fetal surveillance and planning proper timing of delivery [89

]

Obstetric complications:

Anemia	X2	Preterm delivery	X6
Pre-eclampsia	X3	cesarean section	X2
Eclampsia	X4		
antepartum Hemorrahage	X2		
Postpartum Hemorrhage	X2		
IUGR	X3		

LABOUR:

I) Presentation : The twin may present as follows:

1) Twin – A vertex with Twin B – Vertex

2) Twin – A vertex with Twin B – Non Vertex

3) Twin – A Nonvertex with Twin B – Non Vertex

4) Twin – A Nonvertex with Twin B – Vertex

The incidence of the presentation varies with each twin pregnancy with vertex presentation of the first twin along with non vertex of second twin is the most common[62]

2)Premature rupture of membranes:

Premature rupture of membranes refers to the rupture of fetal membranes before the onset of labour or before 37 weeks of gestation. It accounts for 2-4% in singleton pregnancies compared to 7-10% of twin pregnancies, producing 10% mortality PROM occurs typically in the presenting sac, but it can also occur in non-presenting twin after invasive procedures[93]

3) Gestational Age at the time of Delivery:

Gestational age and birth weight are the two most important factors that has a great influence on the perinatal morbidity and mortality. Lower morbidity and mortality rates occurs in the period of 37 – 38 wks of gestation. Hence prolongation of pregnancy upto that gestational age should be the goal[90]

4) Discordancy :

Fetal growth discordance is defined as ≥ 20% difference in estimated fetal weight between fetuses of same pregnancy is marker of growth abnormality, associated with perinatal mortality and morbidity incidence accounts for 5 – 15% in twin pregnancy. Risk factors for discordant growth include monochorionic placenta, pre-eclampsia and antepartum hemorrhage.

5) Chorionicity:

As described earlier the twin may be dichorionic diaminiotic, monochorionic diamniotic, monochorionic monoamniotic. The outcome of Dichorionic diamniotic twin is better than the monochorionic twins. The congenital anomalies such as twin – twin transfusion syndrome, malformations of the fetus, hydramnios, etc., occur more commonly in the monochorionic twins and they are more prone for morbidity and mortality.

6) Mode of Delivery:

One of the most contraversial issue is the mode of delivery of the twin pregnancy. In present senario the delivery is based on individual needs and experience.

a) Vertex – vertex: The American College of obstetrics and gynaecology had published that vaginal birth is appropriate for this kind presentation.

b) Vertex- Non-vertex:

Incidence is around 35% twins. After 35 weeks either vertex – breech or vertex – transverse lie presentations outcome doesn't vary with each other. One school of thought is if weight of twin II is >1500 grams, >32 wks gestation can be delivered vaginally irrespective of its presentation. But on the other hand, most of the obstetricians follow cesarean section in the anticipation of complications in twin – II such as cord prolapse, prolonged interval of delivery of twin B, birth trauma, perinatal morbidity and mortality. Even the planned vaginal delivery ends up in emergency cesarean section. In cases where twin-I is delivered vaginally has 7% chances for the Twin – II to be delivered by emergency cesarean section.

c) Non – vertex twin – A:

Cesarean section is only mode of delivery followed after 24 weeks. This is because of the complications such as interlocking of twins occurs 10 times more frequently in Breech – vertex than vertex – breech[102]

7) Interval between birth of Twins:

Previously interval between the delivery of twin I and twin II was considered optimally to be 10 – 20 minutes. Early delivery with duration less than 10 min was associated with increased intrapartum injury where as interval longer than 20 minutes was not indicated because of the increase in morbidity and mortality in the second twin by the reduction of utero-placental circulation. With the presence of electronic fetal monitoring the time interval between the delivery of twin I and twin II has got no practical significance. But anyway the clinician should always be thoughtful of the remaining fetus and time interval should be limited to minimize complications[115]

8) Cord prolapse:

Multi-fetal pregnancies have an increased risk of cord prolapse. It is more common in the second twin even with successful vaginal delivery of first twin, warranting emergency cesarean section for twin – II. Abnormal cord insertion, placenta previa, low lying placenta are the risk factor for prolapse of cord in case of twin pregnancy (cesarean delivery of second twin Sullivan CA, 1998).

9)Locking and collision:

Interlocking of the twins is usually diagnosed in the second stage of labour and it is very rare with the incidence of 1 in 90,000 deliveries. Nissen's classification is used to classify the different types of locking of twins. Most common type is 1 – twin A in Breech with twin B in vertex presentation. Based on the size of the twins, larger twins lock above pelvic inlet and smaller twins lock after descending into the pelvis. Since this condition occurs in second stage of labour, cesarean section cannot reduce the mortality rate. (The case of locked twin; Murphy 1921).

10) Post partum Hemorrhage:

In cases of twin pregnancy the overdistension of the uterus may weaken the contraction and retraction of the uterine muscles and increase the risk of postpartum hemorrhage. The average blood loss during vaginal delivery of twin delivery is 935 ml which is very much compared to singleton delivery. Both active mangagment and careful observation is the universally needed in cases of twin deliveries. The postpartum hemorrhage according to some study is found to vary with the gestational age at the time of delivery and the birth weight of the fetuses. (Management of postpartum hemorrhage – Norris CT – 1997)

11) Perinatal mortality and Morbidity in Relation to Gestational Age at Delivery:

The optimal gestational age for twin is around 37-39 weeks according to its effect on Morbidity and perinatal mortality. Twins with gestational age less than 28 wks may suffer from morbidity due to extreme prematurity, preterm delivery is more common in twin pregnancy, even then it is necessary to prolong the length of gestation to atleast > 34 wks for better outcome to fetuses (comparison of neonatal morbidity of second twin Eur J.Obstet. and Gynecol 2003)

12. Effect of Birth Weight:

Birth weight is found to be the most important factor correlating with mortality rates. Preterm – Low birth weight is the major cause for perinatal mortality and morbidity. Birthweight of twin pregnancy is the same as singleton until 28 – 30wks of gestation there after the growth of twin laggs down.

Discordancy may be due to the placental site receiving more perfusion than the other. Discordancy may result from fetal malformations, genetic syndromes, infection, unbilical cord abnormalities [102]

13) Anaesthesia Complication:

General anaesthesia is the repeated major cause for perinatal mortality whether cesarean is performed under emergency or elective for twin pregnancy, it should be done under regional anaesthesia, which is advantage to both mother and fetus in a way such that mother is prevented from the risk of aspiration, placental perfusion to the fetus is increased. General anaesthesia on the other hand has the risk of aspiration and poor outcome of the second twin. General Anaesthesia is indicated if,

1) Absolute contra indication to regional anaesthesia as tumour of spinal cord, deformity of spine.

2) In cases where immediate delivery is required epidural / spinal is not in place[96]

14) Perinatal Mortality:

Perinatal mortality is defined as the death of fetus > 28 wks of gestation to 7 days after delivery. Twin pregnancies experiences 4-10 times higher perinatal mortality rate when compared to the singleton pregnancies. Perinatal mortality was strongly associated with congenital anomalies, Asphyxia, RDS, Birth weight, chorionicity, discordancy, seizure, sepsis, Admisison to NICU and need for ventilator. Perinatal care is the best indicator of obstetric care received by the patient.

Relative hazard of the second twin:

Potter and faller strongly insisted that there is no increased risk of second twin, were supported by several others in this issue. But camilleri, published that there was relatively higher mortality of the second twin. The possible reasons would be sudden decompression of the uterus after the delivery of the first twin causing relative asphyxia.

Malpresentation occur in second twin more commonly compared to the first twin, the incidence of transeverse lie is increased from 0.5% in first to 7.9% in second twin. This partly explain the increased risk of twin II.

Delivery interval to be maintained between the twine for a better

outcome.

Mode of delivery of second twin is largely responsible for the perinatal mortality as internal podalic version and breech extraction, assisted breech delivery, external cephalic version and instrumental delivery contribute to a major to it[139]

Neuro development of children from this Pregnancy.

The Neurodevelopment of neonates from this pregnancy is influenced by their prematurity, low birth weight and very low fetal weight causing morbidity, high rates of mortality and long term neurosequlae. Neonates associated with complications are the ones weighing <1000 gms (with risk of IVH), monozygotic twins, single fetal demise in late second trimester leading to the cerebral palsy in second twin, the risk is 15 times greater.

In general disability of hearing, sight, gait and speech can be detected after second year of age; where as disorders of mild to moderate degree cannot be fully detected until 5-7 years of age. The Twin Birth Study, as international multicenter randomized study is trying to find answers for all unanswered questions in twin pregnancy[124]

Antepartum Bed rest and diet:

Some writers have reported good effects of ante partum bed rest over the outcome of twin pregnancy. In a study at Africa with balanced diet and adequate rest, there was weight gain in the early period of pregnancy in the mother leading to the reduction of prematurity and improved birth weight of the fetus and thus the mortality and morbidity.

It can be concluded that maternal rest and balanced diet confer some benefits on the fetus making it more resistant to the hazards faced during the labour and first week of life.

AIMS&OBJECTIVES :

To compare the perinatal morbidity and mortality of presenting Twin to its co-twin based on

- Mode of delivery
- Gestational age at the time of delivery
- Chorionicity
- Discordancy
- Twin-Twin delivery interval
- Birth weight

DESIGN OF STUDY : Prospective analytical study

PERIOD OF STUDY : 1 Year

COLLABORATING DEPARTMENT : Department of Paediatrics

MATERIALS AND METHODS:

STUDY GROUP:

- Women admitted with labour pain,prom to labour ward in obstetrics &Gynaecology,

Department ,Govt. Rajaji Hospital , Madurai.

irrespective of the gestational age and place of ante-natal check-up

.

- Delivery conducted by obstetrician.(post graduate and assitant professor)

INCLUSION CRITERIA:-

1.Twin pregnancies >28wks gestation.

2.Maternal age between 18-40years.

EXCLUSION CRITERIA:-

1.Twin pregnancies < 28wks gestation.

2.Congenital Anomalies in fetusus (based on

second trimester USG)

3.Intra-uterine fetal death of either of the twins at admission.

4.Cases of twin-twin transfusion syndrome, other twin related complications.

5.Inadequate antenatal data.

METHODOLOGY:

- Approval is obtained from the institutional ethical committee.
- Permission obtained from the collaborating department.
- The study is conducted on antenatal women with twin pregnancy admitted to labour ward for delivery.
- Patients are allotted based on inclusion and exclusion criteria.
- Patients are selected randomly and informed consent is obtained.

DATA COLLECTION:

Age

Parity

Occupation

Socioeconomic status

Duration of Marriage

Treatment for infertility

Clinical examination

USG(To r/o congenital anomalies)

Gestational age at which patient had come for labour

Mode of delivery

Twin-Twin delivery interval

Birth weight of first & second Twin

Chorionicity

Apgar scores at 1 and 5

Admission in NICU

MORBIDITY FACTORS:

- RDS
- IVH
- NEED FOR MECHANICAL VENTILATION
- SEPSIS
- SEIZURE
- DURATION OF HOSPITAL STAY

RESULTS AND INTERPRETATION

Table 1-AGE DISTRIBUTION

AGE			TYPE		Total
			TWIN 1	TWIN 2	
	1 (BELOW 30)	Count	98	98	196
		% within TYPE	94.2%	94.2%	94.2%
	2 (ABOVE 30)	Count	6	6	12
		% within TYPE	5.8%	5.8%	5.8%
Total		Count	104	104	208
		% within TYPE	100.0%	100.0%	100.0%

Table 1 shows the socio demographic variable maternal age distribution. In our study twin birth is more common in the women with age group less than 30yrs with the percentage of 94.2%.Maternal age more than 30yrs contributed to 5.8% of our total study population.

Table-2 SEX OF THE BABY

SEX OF THE BABY			TYPE		Total
			TWIN 1	TWIN 2	
	1 MALE	Count	56	57	113
		% within TYPE	53.8%	54.8%	54.3%
	2 FEMALE	Count	48	47	95
		% within TYPE	46.2%	45.2%	45.7%
Total		Count	104	104	208
		% within TYPE	100.0%	100.0%	100.0%

Among the 104 pairs of twins 53.8% of Twin-I were males,46.2% were females.In Twin –II 54.8% were males,45.2% were females.Incidence of male Foetuses was higher among both twin-I and twin-II.

Table-3 PARITY

PARITY			TYPE		Total
			1 TWIN 1	2 TWIN 2	
	1 PRIMI	Count	46	46	92
		% within TYPE	44.2%	44.2%	44.2%
	2 MULTI	Count	58	58	116
		% within TYPE	55.8%	55.8%	55.8%
Total		Count	104	104	208
		% within TYPE	100.0%	100.0%	100.0%

Among 104 twins,55.8% were born to multigravida,44.2% were born to primigravida.In our study twin delivery is higher in multigravida.

Table 4 SOCIO ECONOMIC STATUS

SE STATUS		TYPE 1 TWIN 1	TYPE 2 TWIN 2	Total
3 UPPER MIDDLE	Count	12	12	24
	% within TYPE	11.5%	11.5%	11.5%
4 LOWER MIDDLE	Count	46	46	92
	% within TYPE	44.2%	44.2%	44.2%
5 LOWER	Count	46	46	92
	% within TYPE	44.2%	44.2%	44.2%
Total	Count	104	104	208
	% within TYPE	100.0%	100.0%	100.0%

In our study 11.5% of the population belong to class 3 socio-economic status 44.3% belongs to class 4 socio-economic status as well as 44.5% to class 5 socio-economic status according to modified kuppusamy scale.

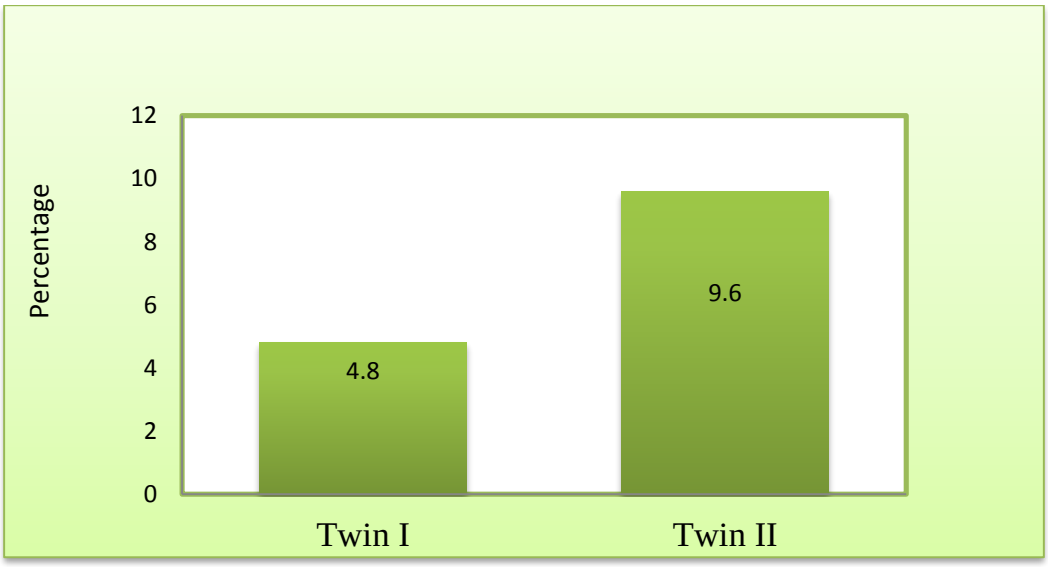
TABLE NO: 5 RDS - GESTATIONAL AGE

S.No	RDS	TWIN – I				TWIN - II			
		GESTATIONAL AGE				GESTATIONAL AGE			
		<32	32-36	>36	TOTAL	<32	32-36	>36	TOTAL
1	NO	5 (4.8)	43 (41.3)	33 (31.7)	81 (77.9)	0 (.0)	29 (27.9)	31 (29.8)	60 (57.7)
2	YES	5 (4.8)	16 (15.4)	2 (1.9)	23 (22.1)	10 (9.6)	28 (26.9)	6 (5.8)	44 (42.3)
		X^2=10.83 , df=2 , p<.004				X^2=25.04 , df=2 , p<.000			

Table 5 shows that the occurrence of respiratory distress is 9.6%(10/104) in case of Twin II of gestational age less than 32 weeks when compared to Twin I of same gestational age which is 4.8%(5/104).

CHART-5.1

RDS in Gestational Age Less than 32 weeks



On comparing the Twins of the gestational age 32-36 weeks,respiratory distress is around 26.9%(28/104) in case of Twin II which is higher compared to Twin I which is only 15.4%(16/104).

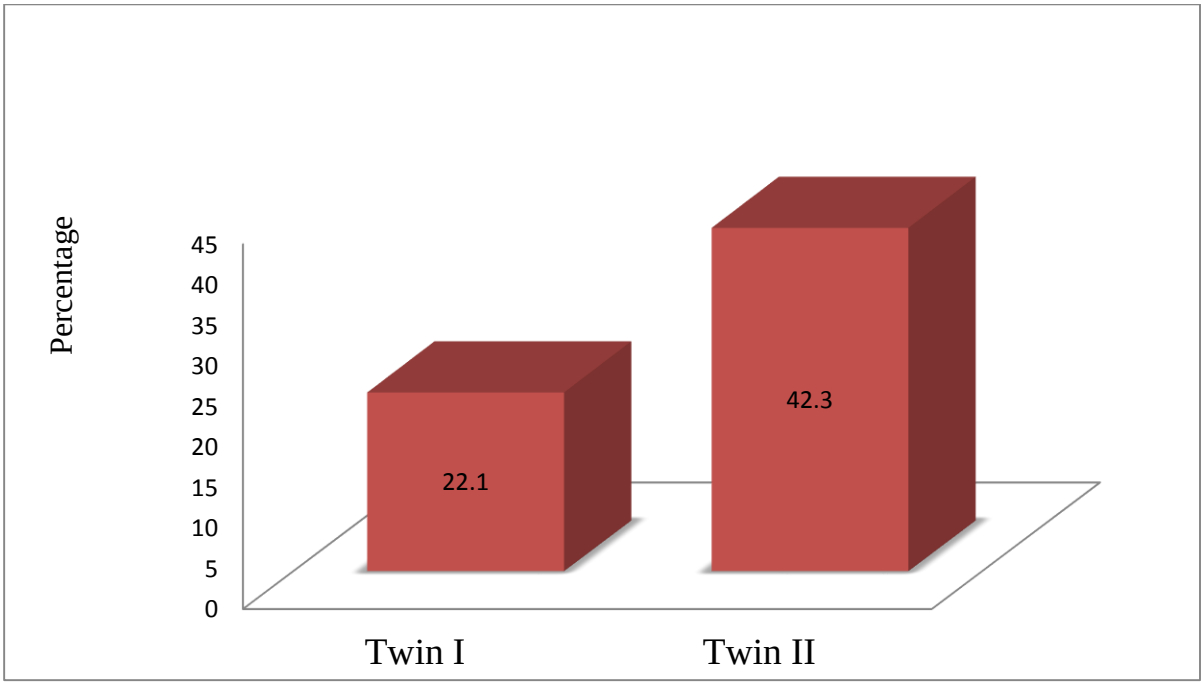
CHART-5.2

RDS in Gestational Age 32 - 36 weeks

Twins of gestation age more than 36 weeks when compared showed 42.3%(44/104) incidence of respiratory distress syndrome in Twin II where as only 22.1% (23/104) in Twin I.

CHART-5.3

RDS in gestational age more than 36 weeks



Therefore the occurrence of respiratory distress syndrome is more common in Twin ii in all gestational age groups,which is analysed using chi-square test and it is statistically significant value of 25.04 in Twin II compared to 10.83 in Twin I.

P value of <0.000 in Twin II makes the analysis highly significant.

Table : 6 IVH - GESTATIONAL AGE

S.No	IVH	TWIN – I				TWIN - II			
		GESTATIONAL AGE				GESTATIONAL AGE			
		<32	32-36	>36	TOTAL	<32	32-36	>36	TOTAL
1	NO	10 (9.6)	58 (55.8)	35 (33.7)	103 (99.0)	10 (9.6)	56 (53.8)	37 (35.6)	103 (99.0)
2	YES	0 (.0)	1 (1.0)	0 (.0)	1 (1.0)	0 (.0)	1 (1.0)	0 (.0)	1 (1.0)
		X^2=.770 , df=2 , p<.680				X^2=.833 , df=2 , p<.659			

Both Twin I and Twin II have similar incidence of interventricular hemorrhage of 1% in the gestational age group of 32-36 weeks.

There is nil occurrence of IVH in the gestational age less than 32 weeks group and more than 36 weeks group

Table No:7 NEED FOR MECHANICAL VENTILATION - GESTATIONAL AGE

S.No	MECH VENT	TWIN - I				TWIN - II			
		GESTATIONAL AGE				GESTATIONAL AGE			
		<32	32-36	>36	TOTAL	<32	32-36	>36	TOTAL
1	NO	0 (.0)	36 (34.6)	31 (29.8)	67 (64.4)	0 (.0)	26 (25.0)	31 (29.8)	57 (54.8)
2	YES	10 (9.6)	23 (22.1)	4 (3.8)	37 (35.6)	10 (9.6)	31 (29.8)	6 (5.8)	47 (45.2)
		X^2=27.31 , df=2 , p<.000				X^2=26.61 , df=2 , p<.000			

Need for Mechanical ventilation is the same in both Twin I and Twin II and is 9.6%(10/104) in th gestational age group of less than 32 weeks.

Gestational age of 32 -36 weeks showed a slightly higher need for ventilation for Twin II -29.8%(31/104) compared to 22.1%(23/104) of Twin I.

Twin II of gestational age more than 36 weeks needed 5.8%(6/104) of ventilatory care compared to 3.8% of Twin I.

This increased need for mechanical ventilation in Twin II is due to the increased occurrence of RDS in Twin II.

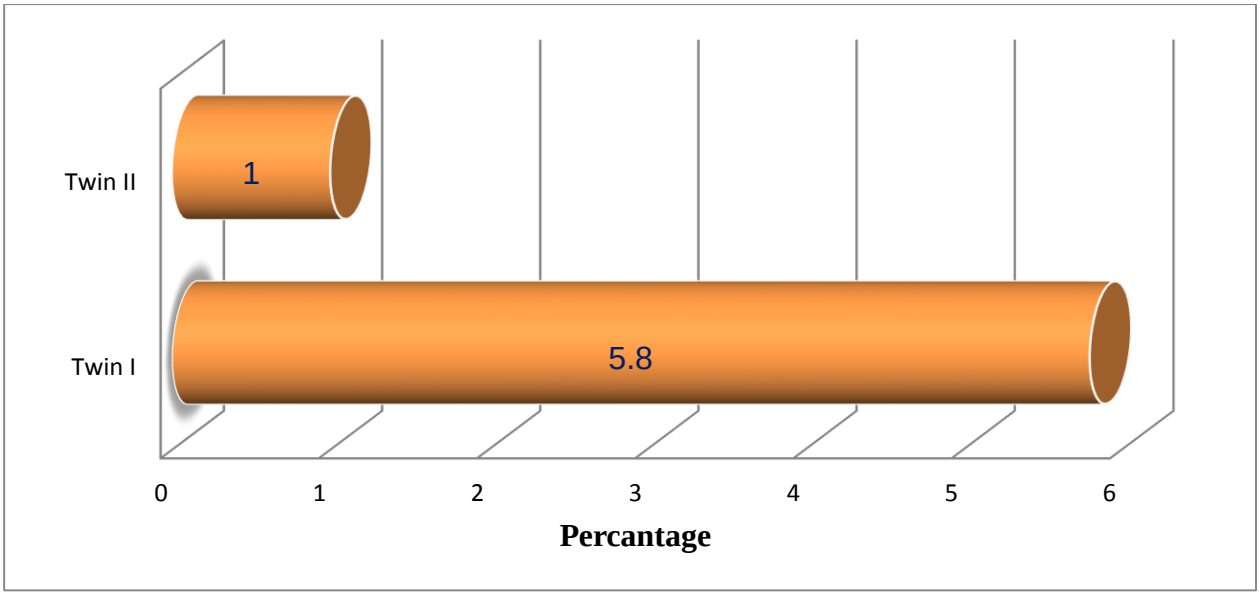
Chi square analysis was done showing statistically significant value of 27.31 and significant P value of <0.000.

Table No: 8 SEPSIS - GESTATIONAL AGE

S.No	SEPSIS	TWIN – I				TWIN - II			
		GESTATIONAL AGE				GESTATIONAL AGE			
		<32	32-36	>36	TOTAL	<32	32-36	>36	TOTAL
1	NO	4 (3.8)	40 (38.5)	32 (30.8)	76 (73.1)	9 (8.7)	54 (51.9)	36 (34.6)	99 (95.2)
2	YES	6 (5.8)	19 (18.30	3 (2.9)	28 (26.9)	1 (1.0)	3 (2.9)	1 (1.0)	5 (4.8)
		X^2=12.38 , df=2 , p<.002				X^2=.973 , df=2 , p<.615			

CHART-8.1

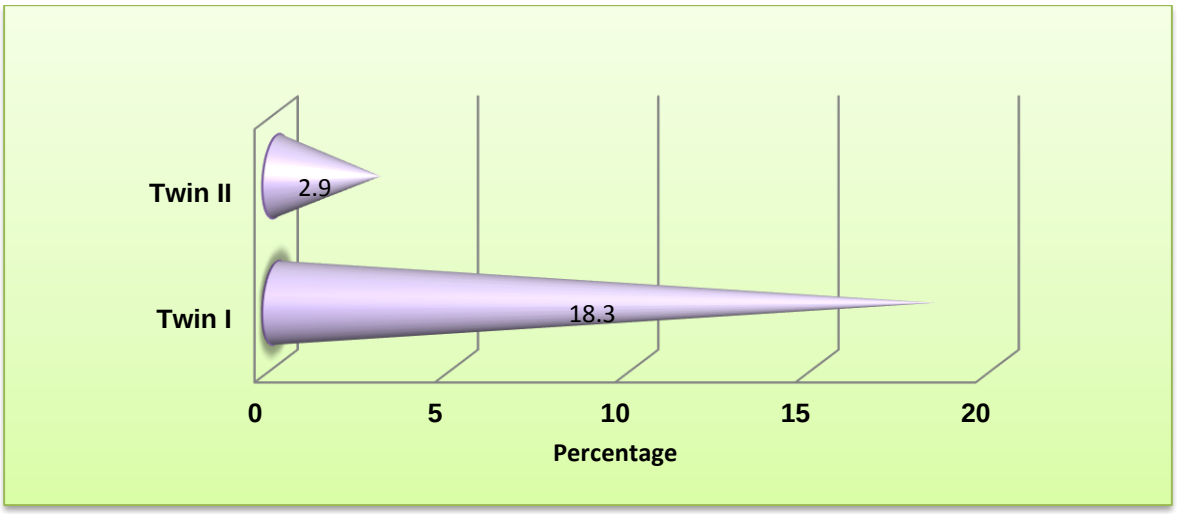
Sepsis in Gestational age less than 32 weeks



Rate of sepsis is higher in Twin I in the gestational age group less than 32 weeks accounting to 5.8%(6/104). In contrary to Twin II which is 1%(1/104).

CHART-8.2

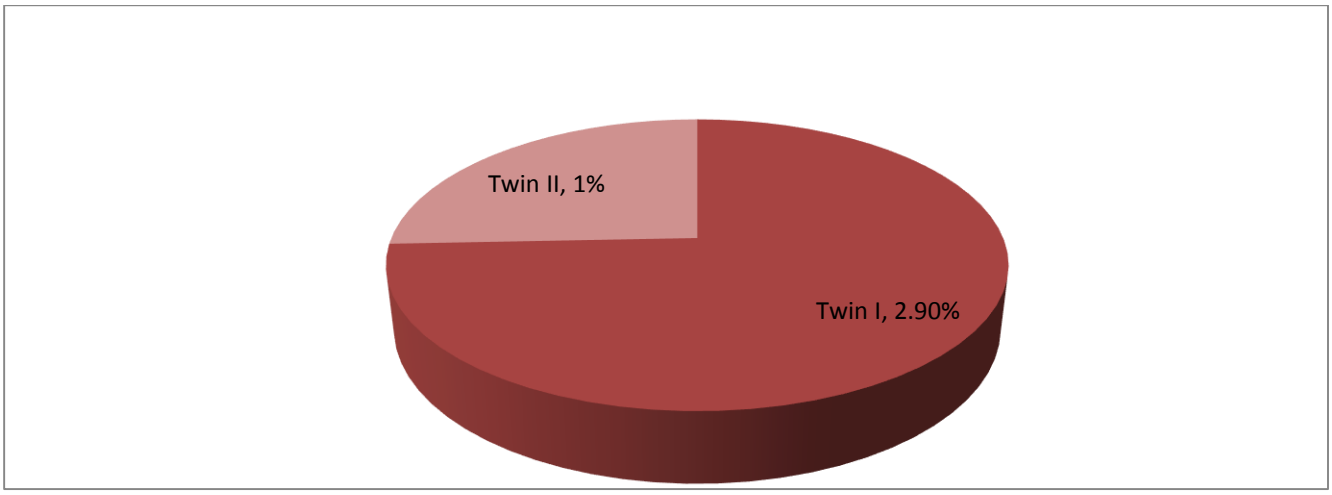
Sepsis in Gestational age 32 - 36 weekS



In the gestational age group of 32 -36 weeks,the incidence of sepsis is 18.3%(19/104) in Twin I which is around 9 times higher than the Twin II of same gestational age which is 2.9%(3/104).

CHART-8.3

Sepsis in Gestational age More than 36 weeks



2.9%(3/104) of Twin I of gestational age more than 36 weeks have sepsis when compared to 1%(1/104) of Twin II of the same group.

Finally the incidence of sepsis is higher in Twin I in all the three gestational age groups with statistically significant Chi square value of 12.38 compared to 0.973 of Twin II with highly significant P value of <0.002.

Table No: 9 SEIZURE - GESTATIONAL AGE

S.No	SEIZURE	TWIN - I				TWIN – II			
		GESTATIONAL AGE				GESTATIONAL AGE			
		<32	32-36	>36	TOTAL	<32	32-36	>36	TOTAL
1	NO	10 (9.6)	57 (54.8)	33 (31.70	100 (96.2)	10 (9.6)	57 (54.8)	36 (34.6)	103 (99.0)
2	YES	0 (.0)	2 (1.9)	2 (1.9)	4 (3.8)	0 (.0)	0 (.0)	1 (1.0)	1 (1.0)
		X^2=.764 , df=2 , p<.683				X^2=1.828 , df=2 , p<.401			

Seizures occurred in 1.9%(2/104) of Twin I in the gestational age group of 32-36 weeks on par with 0%(0/104) of Twin II.

1.9%(2/104) seizures occurred among Twin I in gestational age more than 36 weeks group compared to 1%(1/104) of Twin II in the same group.

The occurrence of seizure is common in Twin I in our study with moderately significant Chi-square value of 0.764.

Table No: 10 DURATION OF HOSPITAL STAY - GESTATIONAL AGE

S.No	HOSPITAL STAY	TWIN - I				TWIN - II			
		GESTATIONAL AGE				GESTATIONAL AGE			
		<32	32-36	>36	TOTAL	<32	32-36	>36	TOTAL
1	<7 DAYS	2 (1.9)	46 (44.2)	33 (31.7)	81 (77.9)	4 (3.8)	42 (40.4)	33 (31.7)	79 (76.0)
2	>7 DAYS	8 (7.7)	13 (12.5)	2 (1.9)	23 (22.1)	6 (5.8)	15 (14.4)	4 (3.8)	25 (24.0)
		X^2=24.91 , df=2 , p<.000				X^2=10.79 , df=2 , p<.005			

Long duration of hospital stay of more than 7 days is seen in 7.7%(8/104) of Twin I of gestational age less than 32 weeks compared to 5.8%(6/104) of twin II of the same group.

14.4%(15/104) of Twin II of gestational age 32 -36 weeks group is having longer hospital stay as compared to 12.5% (13/104)of Twin I.

3.8%(4/104) of Twin II has hospital stay of more than 7 days on contrary to 1.9%(2/104) of Twin I of the gestational age group of more than 36 weeks.

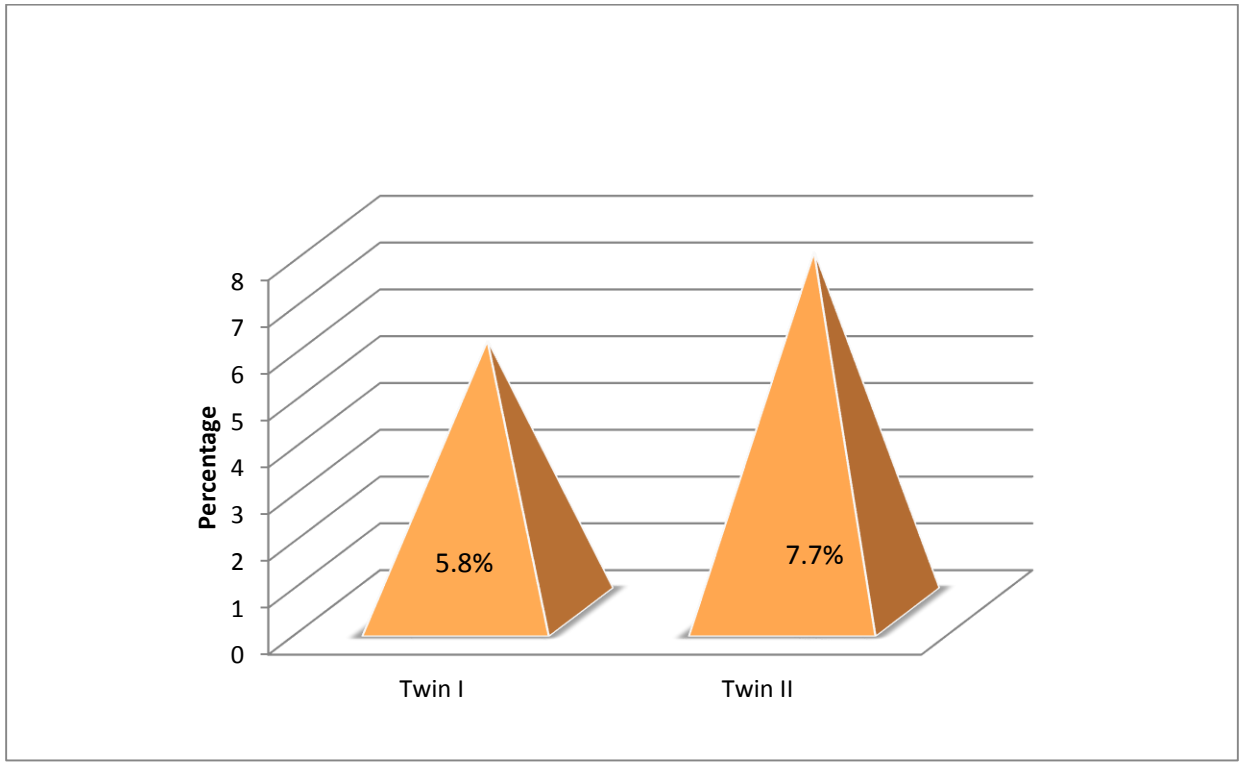
Therefore the long duration of hospital stay is more common in Twin II in all the three groups of gestational ages.

Table No: 11 MORTALITY - GESTATIONAL AGE

S.No	MORTALITY	TWIN – I				TWIN - II			
		GESTATIONAL AGE				GESTATIONAL AGE			
		<32	32-36	>36	TOTAL	<32	32-36	>36	TOTAL
1	NO	4 (3.8)	52 (50.0)	33 (31.7)	89 (85.6)	2 (1.9)	50 (48.1)	37 (35.6)	89 (85.6)
2	YES	6 (5.8)	7 (6.7)	2 (1.9)	15 (14.4)	8 (7.7)	7 (6.7)	0 (.0)	15 (14.4)
		X^2=19.29 , df=2 , p<.000				X^2=41.28 , df=2 , p<.000			

CHART-11.1

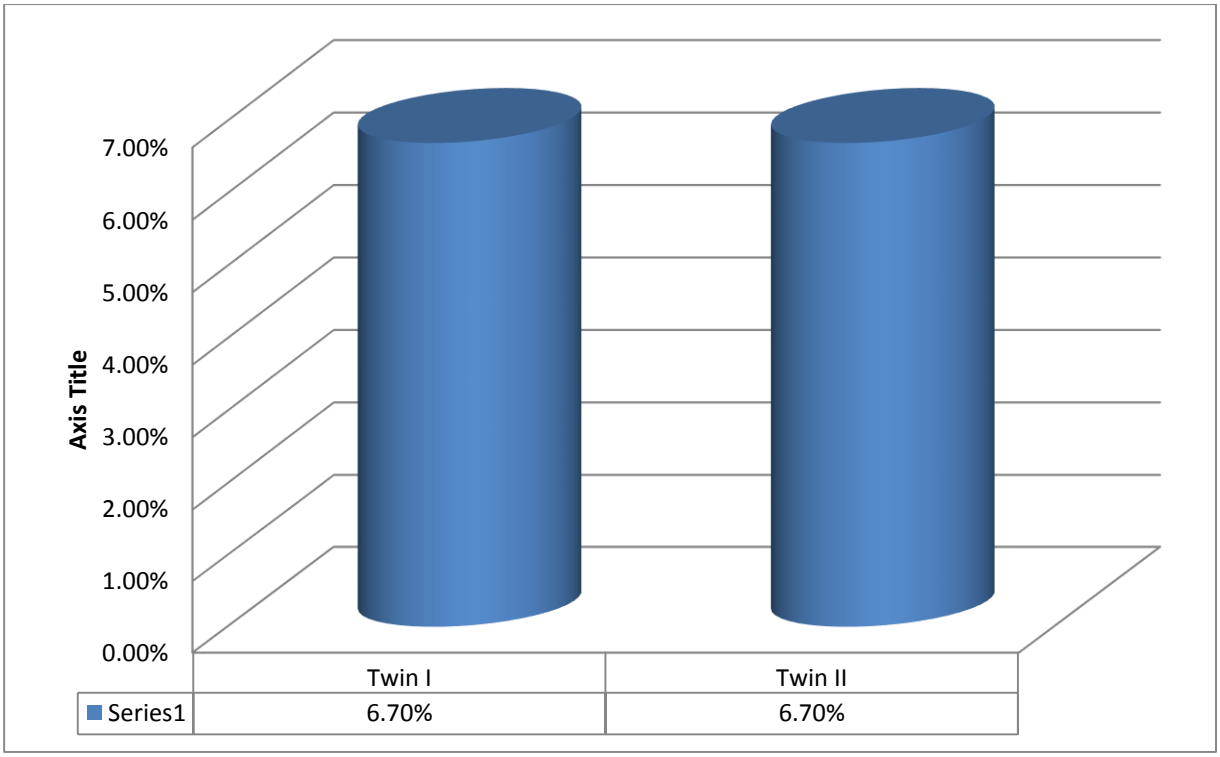
Perinatal mortality in Gestational age Less than 32 weeks



Perinatal mortality is higher in Twin II of less than 32 weeks gestation with the incidence of 7.7%(8/104) compared to5.8%(6/104cases) of Twin I.

CHART-11.2

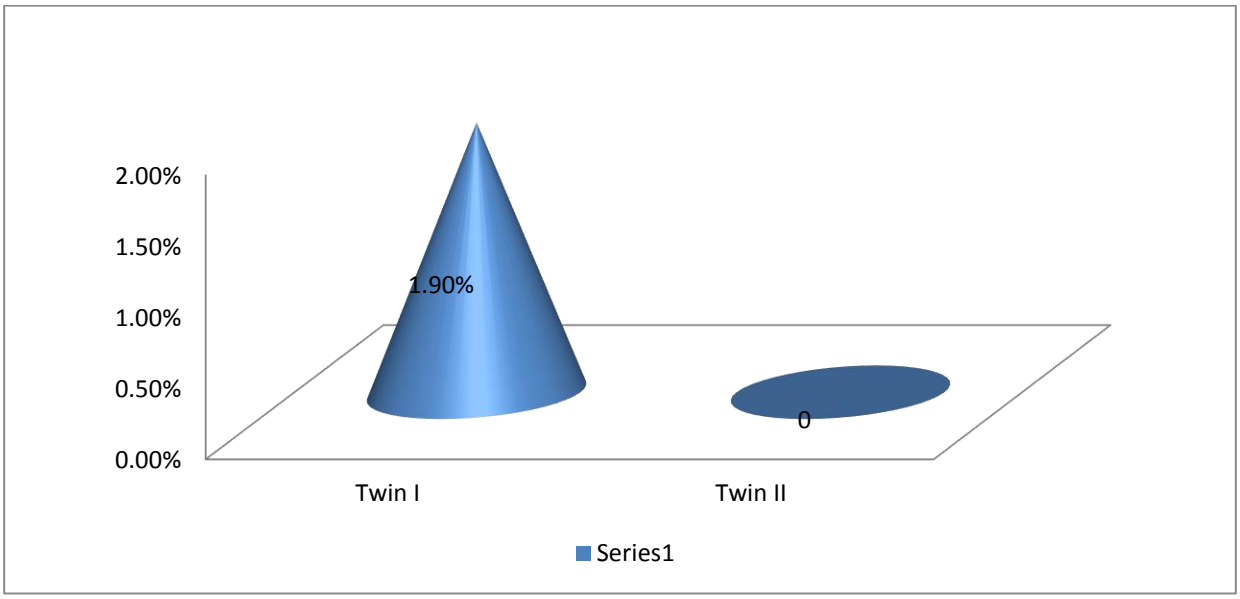
Perinatal mortality in Gestational age 32-36 weeks



Mortality rates are similar -6.7%(7/104 cases) in both Twin I and Twin II in the gestational age group of 32-36 weeks.

CHART-11.2

Perinatal mortality in gestational age more than 36 weeks



Under the more than 36 weeks group,mortality is higher in Twin I that is 1.9%(2/104 cases)were as in twin II there is no mortality in our study.

Eventhough three groups have different outcomes,on the whole on applying Chi-square tests ,the significant value of 41.28 is obtained for Twin II which is very much higher compared o the value of 19.29 of Twin I,with statistically significant P value of <0.000.

Table No: 12 RDS - MODE OF DELIVERY

		TWIN – I			TWIN - II		
S.No	**RDS**	**MODE OF DELIVERY**			**MODE OF DELIVERY**		
		1 L N	**2 L S C S**	**TOTAL**	**1 L N**	**2 L S C S**	**TOTAL**
1	NO	46 (44.2)	35 (33.7)	81 (77.9)	33 (31.7)	27 (26.0)	60 (57.7)
2	YES	21 (20.2)	2 (1.9)	23 (22.1)	33 (31.7)	11 (10.6)	44 (42.3)
		X^2=9.31 , df=1 , p<.002			X^2=4.37 , df=1 , p<.036		

CHART-12.1

RDS in Mode of Delivery - Labour Natural

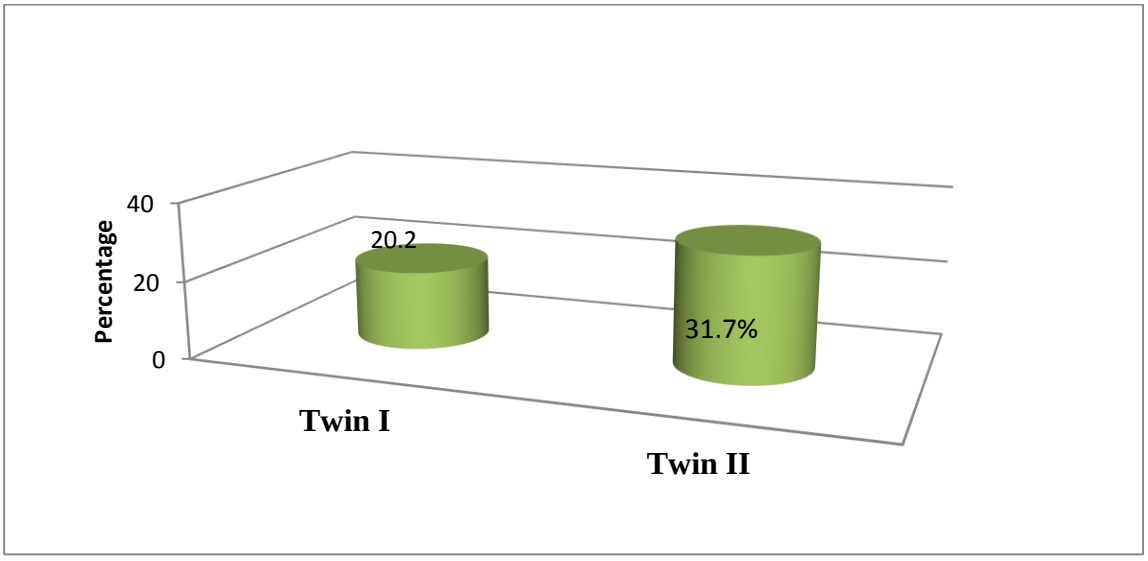


Table 12 shows that the occurrence of RDS is higher in Twin II delivered through Labour Natural and is 31.7%(33/104 cases)compared to Twin I with 20.2%(21/104 cases).

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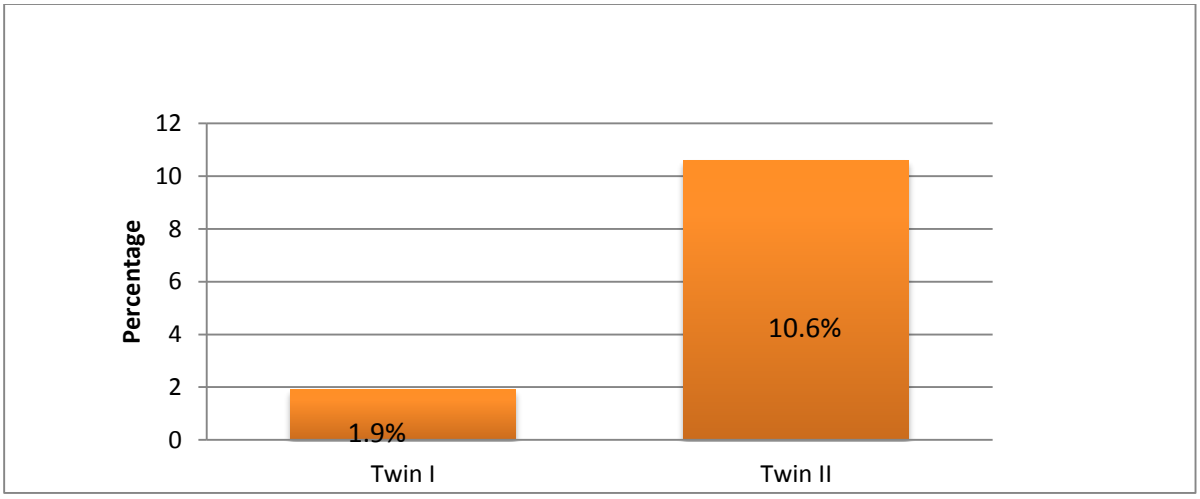
CHART-12.2

RDS in Mode of Delivery - Cesarean Section



Among the LSCS group,Twin II have distress in 10.6%(11/104) of fetusus were as Twin I have it in 1.9%(2/104 cases) of the fetuses irrespective of the gestational age in which LSCS was performed

Therefore both among the vaginal and operative delivery group,the incidence of RDS is higher in Twin II irrespective of the gestational age with statistically significant Chi-square value of 9.31 and significant P value.

Table No: 13 IVH - MODE OF DELIVERY

S.No	IVH	TWIN – I			TWIN - II		
		MODE OF DELIVERY			MODE OF DELIVERY		
		1 L N	2 L S C S	TOTAL	1 L N	2 L S C S	TOTAL
1	NO	66 (63.5)	37 (35.6)	103 (99.0)	65 (62.5)	38 (36.5)	103 (99.0)
2	YES	1 (1.0)	0 (.0)	1 (1.0)	1 (1.0)	0 (.0)	1 (1.0)
		X^2=.558 , df=1 , p<.455			X^2=.581 , df=1 , p<.446		

Both Twin I and Twin II have 1 fetus each having Interventricular hemorrhage falling in the labour natural group contributing to 1% of each group.

Alexander et al.,2005,studied 199 twin pairs,accounting for 2.1 % of IVH in twins born out of instrumental deliveries

Table No: 14 NEED FOR MECHANICAL VENTILATION - MODE OF DELIVERY

		TWIN - I			TWIN - II		
S.No	**MECH VENT**	**MODE OF DELIVERY**			**MODE OF DELIVERY**		
		1 L N	**2 L S C S**	**TOTAL**	**1 L N**	**2 L S C S**	**TOTAL**
1	NO	35 (33.7)	32 (30.8)	67 (64.4)	30 (28.8)	27 (26.0)	57 (54.8)
2	YES	32 (30.8)	5 (4.8)	37 (35.6)	36 (34.6)	11 (10.6)	47 (45.2)
		X^2=12.19 , df=1 , p<.000			X^2=6.38 , df=1 , p<.012		

CHART-14.1

Need for Mechanical Ventilation in Mode of Delivery - Labour Natural

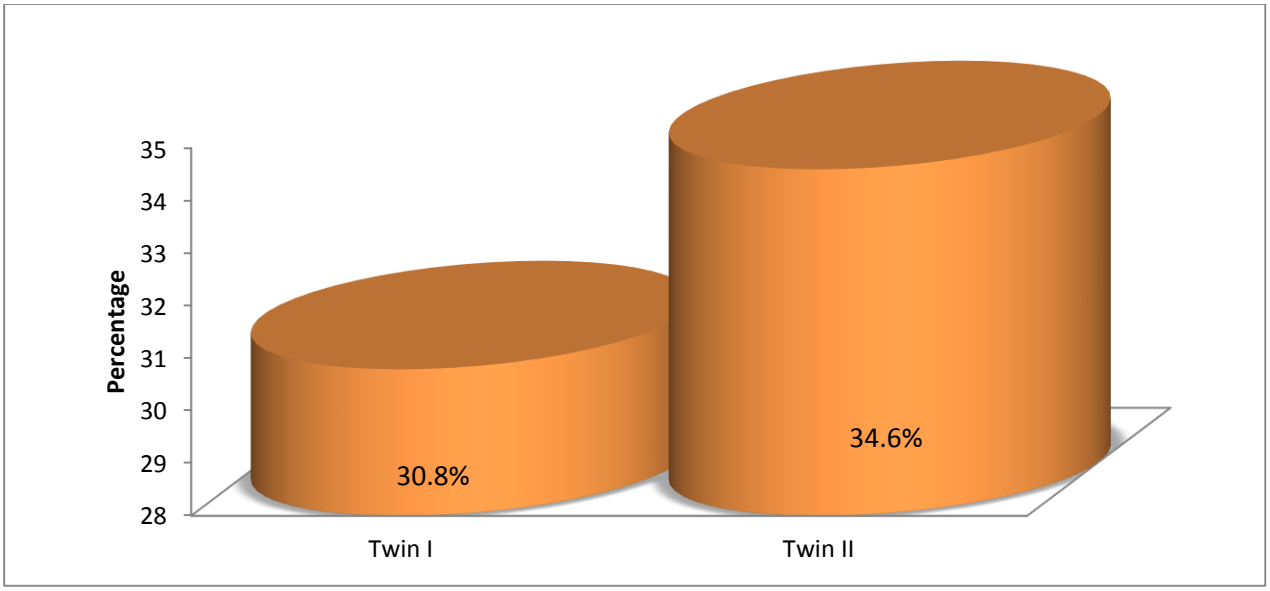
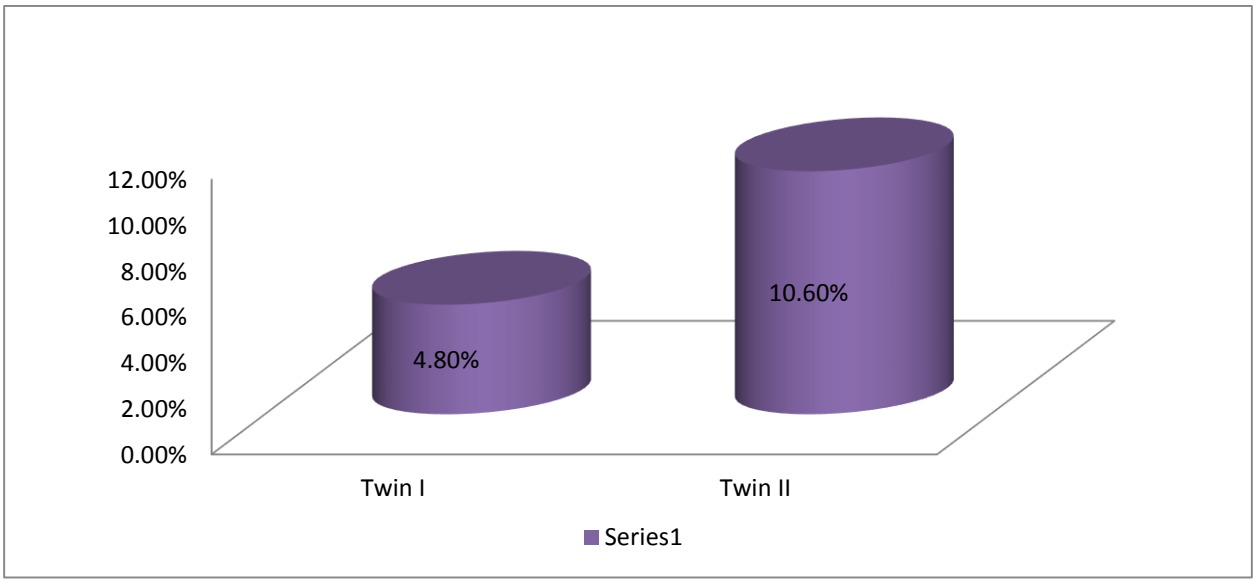


Table shows that the need for ventilation is higher in TwinII with incidence of 34.6%(36/104 cases) compared to 30.8%(32/104 cases) delivered through labour natural.

CHART-14.2

Need for Mechanical ventilation - LSCS



Among the Twins delivered through LSCS also there were 10.6%(11/104 cases) of Twin II group requiring mechanical ventilation in contrast to4.8%(5/104 cases) of Twin I group.

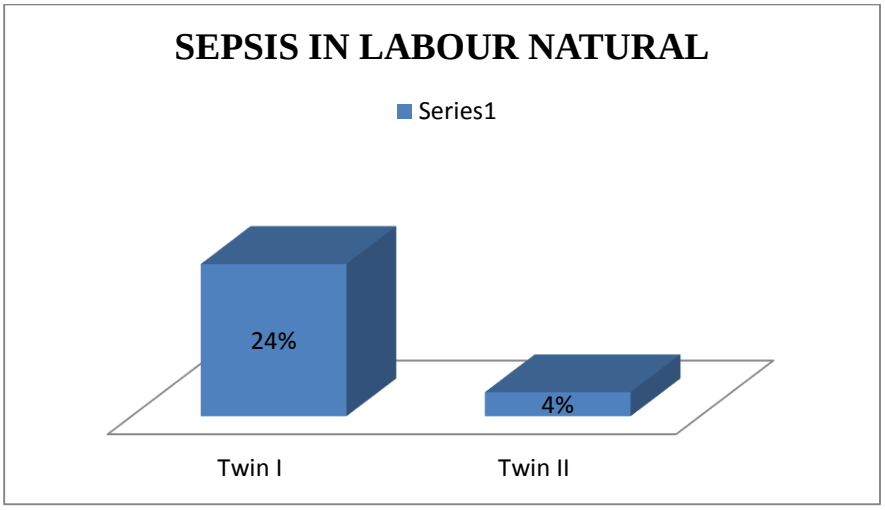
Finally the need for mechanical ventilation is higher among the Twin II delivered through either Labour Natural or LSCS irrespective of the gestational age and is statistically significant with chi-square of 12.19 and P value of <0.000.

Table No: 15 SEPSIS - MODE OF DELIVERY

S.No	SEPSIS	TWIN – I			TWIN - II		
		MODE OF DELIVERY			MODE OF DELIVERY		
		1 L N	2 L S C S	TOTAL	1 L N	2 L S C S	TOTAL
1	NO	42 (40.4)	34 (32.7)	76 (73.1)	62 (59.6)	37 (35.6)	99 (95.2)
2	YES	25 (24.0)	3 (2.9)	28 (26.9)	4 (3.8)	1 (1.0)	5 (4.8)
		X^2=10.33 , df=1 , p<.001			X^2=.620 , df=1 , p<.431		

Table shows sepsis incidence of 24% (25/104 cases) in Twin I delivered through Labour Natural compared to 3.8%(4/104 cases) of twin II delivered through Labour Natural.

CHART 15.1



2.9% (3/104 cases) of Twin I have sepsis compared to 1%(1/104 cases) of Twin II of the fetuses delivered through LSCS.

CHART 15.2

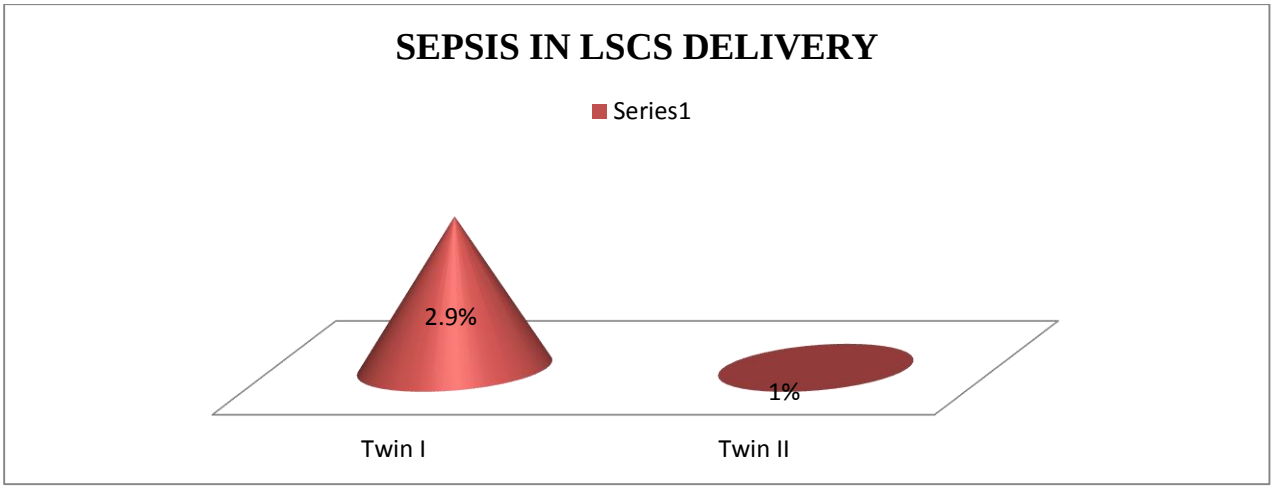


Table No:16 SEIZURE - V6 MODE OF DELIVERY

S.No	SEIZURE	TWIN – I MODE OF DELIVERY			TWIN – II MODE OF DELIVERY		
		1 L N	2 L S C S	TOTAL	1 L N	2 L S C S	TOTAL
1	NO	64 (61.5)	36 (34.6)	100 (96.2)	65 (62.5)	38 (36.5)	103 (99.0)
2	YES	3 (2.9)	1 (1.0)	4 (3.8)	1 (1.0)	0 (.0)	1 (1.0)
		X^2=.203 , df=1 , p<.652			X^2=.581 , df=1 , p<.446		

Table shows incidence of seizure is higher in Twin I delivered through Labour natural-2.9%(3/104 cases)compared to 1%(1/104 cases) of twin II.

1% of Twin I developed seizure ,were as none of the Twin II have. it.

T**able No: 17 HOSPITAL STAY - MODE OF DELIVERY**

S.No	HOSPITAL STAY	TWIN - I MODE OF DELIVERY			TWIN – II MODE OF DELIVERY		
		1 L N	2 L S C S	TOTAL	1 L N	2 L S C S	TOTAL
1	NO	48 (46.2)	33 (31.7)	81 (27.9)	48 (46.2)	31 (29.8)	79 (76.0)
2	YES	19 (18.3)	4 (3.8)	23 (22.1)	18 (17.3)	7 (6.7)	25 (24.0)
		X^2=4.26 , df=1 , p<.039			X^2=1.03 , df=1 , p<.309		

In the Labour Natural group 18.3%(19/104 cases) of Twin I have longer hospital stay compared to 17.3% (18/104)of Twin II.

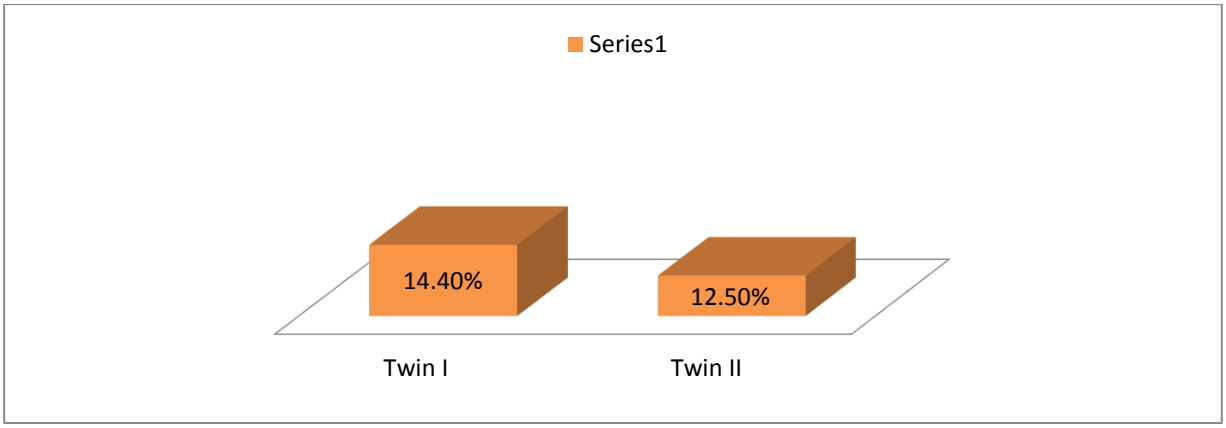
Among the twins delivered through LSCS 6.7%(7/104) have longer hospital stay.

Table No: 18 PERINATAL MORTALITY - MODE OF DELIVERY

S. No	MORTALITY	TWIN - I			TWIN – II		
		MODE OF DELIVERY			MODE OF DELIVERY		
		1 L N	2 L S C S	TOTAL	1 L N	2 L S C S	TOTAL
1	NO	52 (50.0)	37 (35.6)	89 (85.6)	53 (51.0)	36 (34.6)	89 (85.6)
2	YES	15 (14.4)	0 (.0)	15 (14.4)	13 (12.5)	2 (1.9)	15 (14.4)
		X^2=9.68 , df=1 , p<.002			X^2=4.07 , df=1 , p<.044		

CHART-18.1

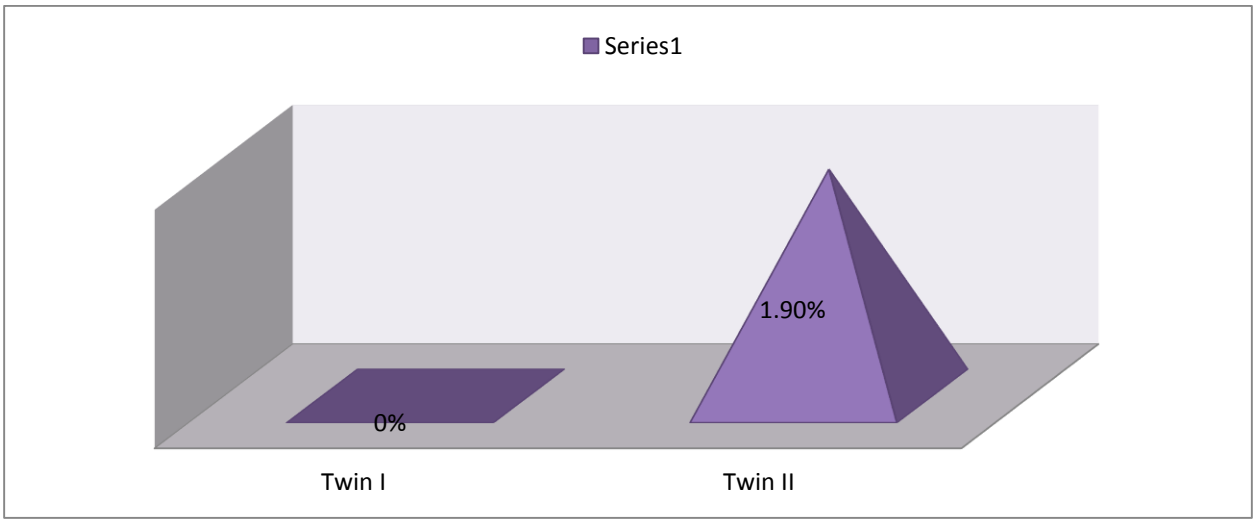
PERINATAL MORTALITY IN LABOUR NATURAL GROUP



Mortality is higher in the Twin I of Labour Natural group with 14.4%(15/104 cases) incidence where as Twin II have 12.5%(13/104 cases) incidence.

CHART-18.2

PERINATAL MORTALITY IN LSCS DELIVERY



Among the fetuses delivered through LSCS Twin II is having mortality rates of 1.9%(2/104 cases) on contrary to 0% of twin I.

Table No: 19 RDS - BIRTH WEIGHT

		TWIN - I				TWIN - II			
S.No	**RDS**	**BIRTH WEIGHT**				**BIRTH WEIGHT**			
		<1.5	**1.5-2.5**	**>2.5**	**TOTAL**	**<1.5**	**1.5-2.5**	**>2.5**	**TOTAL**
1	NO	6 (5.8)	60 (57.7)	15 (14.4)	81 (77.9)	0 (.0)	46 (44.2)	14 (13.5)	60 (57.7)
2	YES	8 (7.7)	14 (13.5)	1 (1.0)	23 (22.1)	15 (14.4)	29 (27.9)	0 (.0)	44 (42.3)
		X^2=12.75 , df=2 , p<.002				X^2=31.12 , df=2 , p<.000			

CHART-19.1

RDS IN BIRTH WEIGHT LESS THAN 1.5 KG

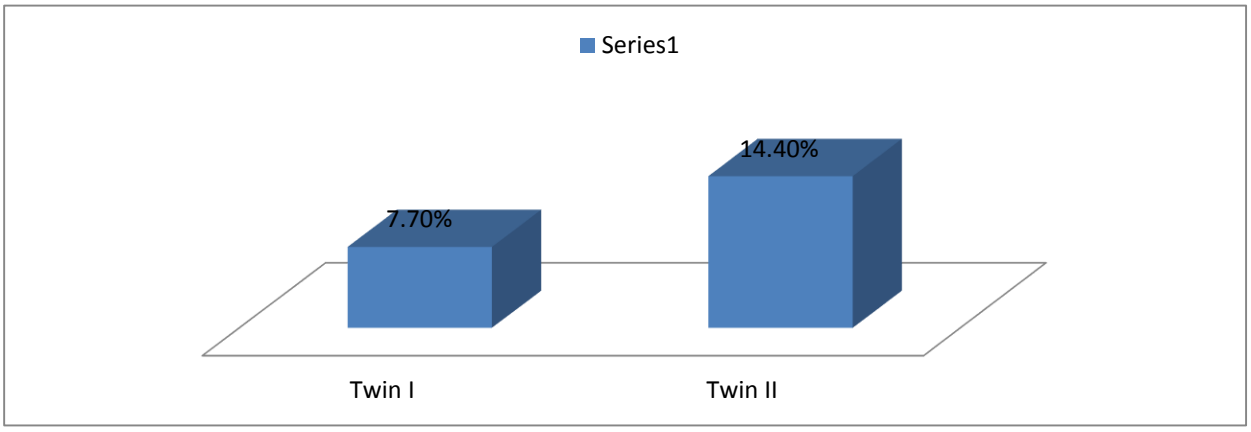
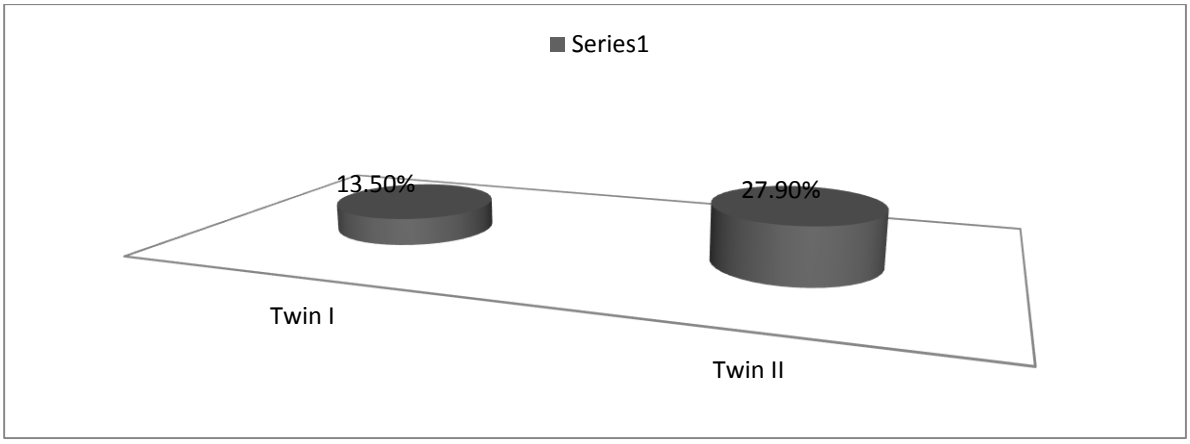


Table shows higher incidence of RDS-14.4% (15/104 cases) in Twin II of birth weight less than 1.5 kg compared to 7.7%(8/104) of Twin I of the same birth weight group.

CHART-19.2

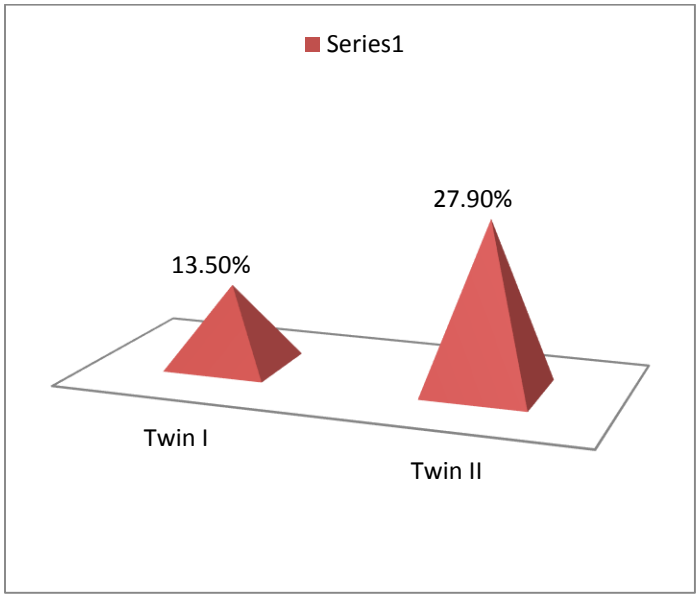
RDS IN BIRTH WEIGHT 1.5-2.5 KG



On comparing the twins of birth weight in the range of 1.5 to 2.5 kg the incidence of RDS is higher in twin II of about 27.9 % whereas in twin I is 13.5%.

CHART-19.3

RDS IN BIRTH WEIGHT MORE THAN 2.5KG



Among the Twins with birth weight more than 2.5kg 1%(1/104 cases) of Twin I have respiratory distress were as none of the TwinII have it.

There parameters when statistically analysed have significance with Chi-square of 31.12 highly significant P value of <0.000.

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Table No: 20 IVH - BIRTH WEIGHT

S.No	IVH	TWIN - I				TWIN - II			
		BIRTH WEIGHT				BIRTH WEIGHT			
		<1.5	1.5-2.5	>2.5	TOTAL	<1.5	1.5-2.5	>2.5	TOTAL
1	NO	14 (13.5)	73 (70.2)	16 (15.4)	103 (99.0)	15 (14.4)	74 (71.2)	14 (13.5)	103 (99.0)
2	YES	0 (.0)	1 (1.0)	0 (.0)	1 (1.0)	0 (.0)	1 (1.0)	0 (.0)	1 (1.0)
		X^2=.409 , df=2 , p<.815				X^2=.390 , df=2 , p<.823			

Only 1%(1/104 cases) of both Twin I and Twin II have interventricular hemorrhage in the birth weight between 1.5 kg to 2.5kg.

Table No:21 NEED FOR MECHANICAL VENTILATION - BIRTH WEIGHT

S.No	MECH VENT	TWIN – I				TWIN – II			
		BIRTH WEIGHT				BIRTH WEIGHT			
		<1.5	1.5-2.5	>2.5	TOTAL	<1.5	1.5-2.5	>2.5	TOTAL
1	NO	1 (1.0)	52 (50.0)	14 (13.5)	67 (64.4)	0 (.0)	43 (41.3)	14 (13.5)	57 (54.8)
2	YES	13 (12.5)	22 (21.2)	2 (1.9)	37 (35.6)	15 (14.4)	32 (30.8)	0 (.0)	47 (45.2)
		X^2=24.86 , df=2 , p<.000				X^2=29.92 , df=2 , p<.000			

Table shows 14.4% (15/104 cases) of Twin II fetuses having respiratory distress compared to 12.5%(13/104 cases) of Twin I of the birth weght less than 1.5kg.

Among the Twins of birth weight of 1.5kg-2.5kg, 30.8%(32/104 cases) of Twin II have respiratory distress compared to 21.2%(22/104 cases) of Twin I.

1.9% of Twin I of birth weight >2.5kg have respiratory distress were as none of Twin II fetuses have respiratory distress.

These datas are statistically significant with Chi-square value of 29.92 with highly significant P value <0.000.

Table No:22 SEPSIS - BIRTH WEIGHT

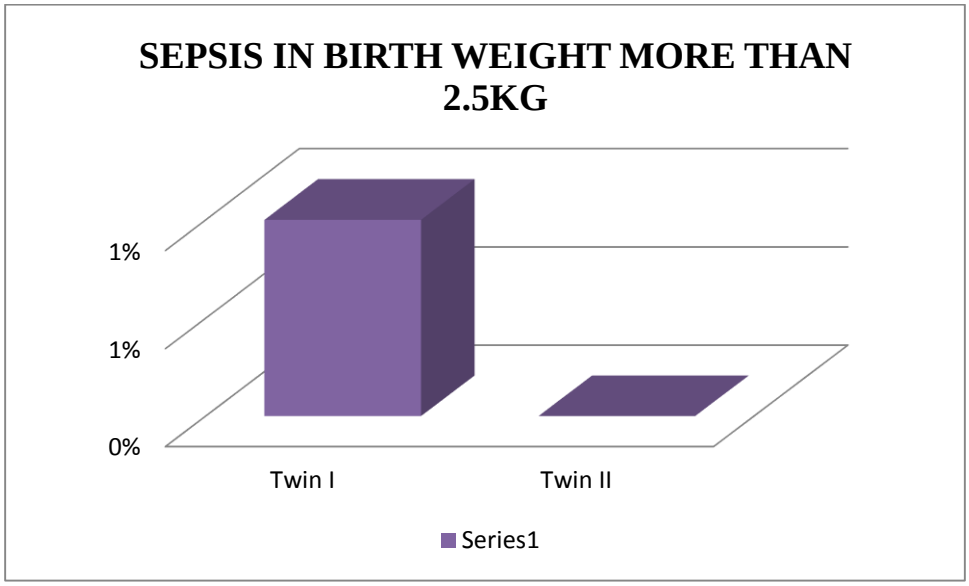
S.No	SEPSIS	TWIN - I				TWIN - II			
		BIRTH WEIGHT				BIRTH WEIGHT			
		<1.5	1.5-2.5	>2.5	TOTAL	<1.5	1.5-2.5	>2.5	TOTAL
1	NO	5 (4.8)	56 (53.8)	15 (14.4)	76 (73.1)	15 (14.4)	70 (67.3)	14 (13.5)	99 (95.2)
2	YES	9 (8.7)	18 (17.3)	1 (1.0)	28 (26.9)	0 (.0)	5 (4.8)	0 (.0)	5 (4.8)
		X^2=13.66 , df=2 , p<.001				X^2=2.03 , df=2 , p<.362			

Sepsis occurs in 8.7%(9/104 cases) of Twin I in the birth weight of less than 1.5kg compared to 0% of the Twin II.

Sepsis occurs in 17.3%(18/104 cases)of Twin I of birth weight 1.5-2.5kg compared to 4.8% (5/104 cases) of Twin II.

Total sepsis in twin I-25.96%,with PROM-77.7%.(<24 hrs-52.4%,>24 hrs-25.3%)

Only 4.8% of twin II have sepsis,with PROM 100%.(<24hrs-87.3%,>24 hrs-23.7%)



1% of Twin I of birth weight >2.5kg have sepsis,were as none have sepsis in TwinII.

Finally,statistical significance is higher with Chi-square 13.66 and P value of<0.001.showing higher incidence of sepsis in Twin I in all the birth weight groups

Table No:23 SEIZURE - BIRTH WEIGHT

S.No	SEIZURE	TWIN – I				TWIN - II			
		BIRTH WEIGHT				BIRTH WEIGHT			
		<1.5	1.5-2.5	>2.5	TOTAL	<1.5	1.5-2.5	>2.5	TOTAL
1	NO	12 (11.5)	72 (69.2)	16 (15.4)	100 (96.2)	15 (14.4)	74 (71.2)	14 (13.5)	103 (99.0)
2	YES	2 (1.9)	2 (1.9)	0 (.0)	4 (3.8)	0 (.0)	1 (1.0)	0 (.0)	1 (1.0)
		X^2=5.02 , df=2 , p<.081				X^2=.390 , df=2 , p<.823			

1.9 %(2/104 cases) of Twin I of birth weight less than 1.5kg have sepsis,were as none of the Twin II have sepsis.

1.9%(2/104cases) of Twin I of weight 1.5kg -2.5kg have sepsis compared to 1% of Twin II of the same birth weight

The analysis has a significant Chi-square of 5.02 with moderately significant P value.

Table No : 24 HOSPITAL STAY - BIRTH WEIGHT

S.No	HOSPITAL STAY	TWIN – I				TWIN - II			
		BIRTH WEIGHT				BIRTH WEIGHT			
		<1.5	1.5-2.5	>2.5	TOTAL	<1.5	1.5-2.5	>2.5	TOTAL
1	<7 DAYS	6(5.8)	60(57.7)	15(14.4)	81(77.9)	10(9.6)	55(52.9)	14(13.5)	79(76.0)
2	>7 DAYS	8(7.7)	14(13.5)	1(1.0)	23(22.1)	5(4.8)	20(19.2)	0(.0)	25(24.0)
		X^2=12.75 , df=2 , p<.002				X^2=5.42 , df=2 , p<.066			

Table shows 7.7%(8/104 cases)incidence of prolonged hospital stay in Twin I of birth weight less than 1.5kg compared to 4.8%(5/104 cases) of Twin II of same group.

19.2%(20/104) of Twin II of weight 1.5 kg -2.5kg stayed longer in the hospital compared to 13.5%(14/104 cases) of Twin I.

Twin I of weight more than 2.5 kg of about1%(1/104 cases)stayed longer in hospital compared to Twin II of same weight.

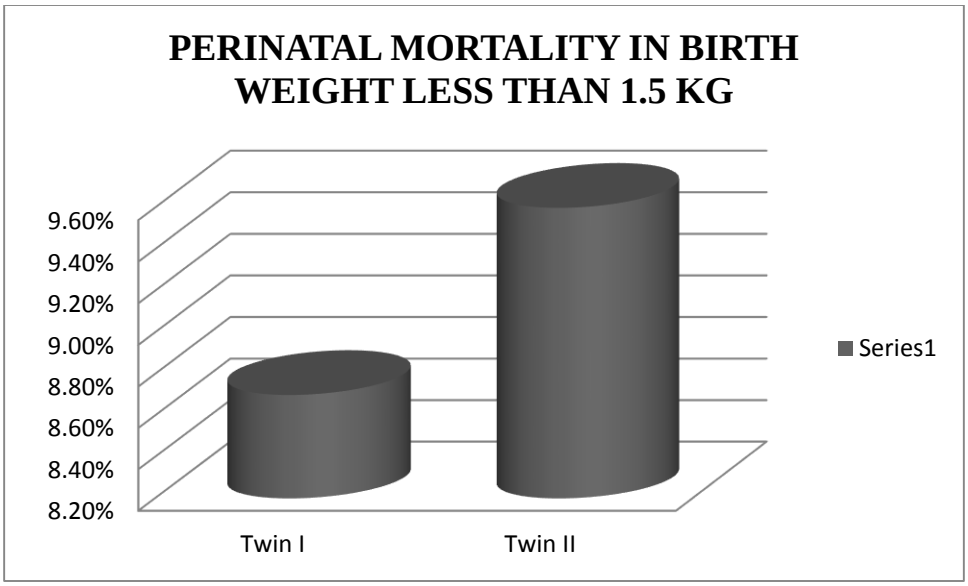
Chi-square is significant with value of 12.75 with highly significant P value of <0.002.

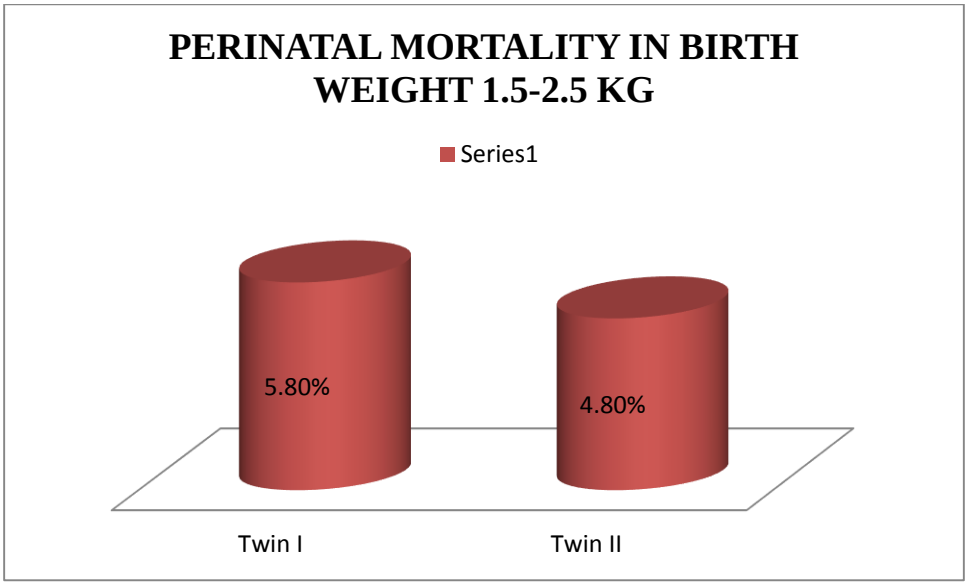
Table No: 25 MORTALITY - BIRTH WEIGHT

		TWIN – I				TWIN - II			
S.No	**MORTALITY**	**BIRTH WEIGHT**				**BIRTH WEIGHT**			
		<1.5	**1.5-2.5**	**>2.5**	**TOTAL**	**<1.5**	**1.5-2.5**	**>2.5**	**TOTAL**
1	NO	5 (4.8)	68 (65.4)	16 (15.4)	89 (85.6)	5 (4.8)	70 (67.3)	14 (13.5)	89 (85.6)
2	YES	9 (8.7)	6 (5.8)	0 (.0)	15 (14.4)	10 (9.6)	5 (4.8)	0 (.0)	15 (14.4)
		X^2=33.28 , df=2 , p<.000				X^2=39.18 , df=2 , p<.000			

9.6%(10/104 cases) of Twin II have mortality compared to 8.7%(9/104 cases) of Twin I of birth weight less than 1.5kg.

Where as 5.8%(6/104 cases) of Twin I of weight 1.5-2.5kg have mortality compared to 4.8% of Twin II of the same group.





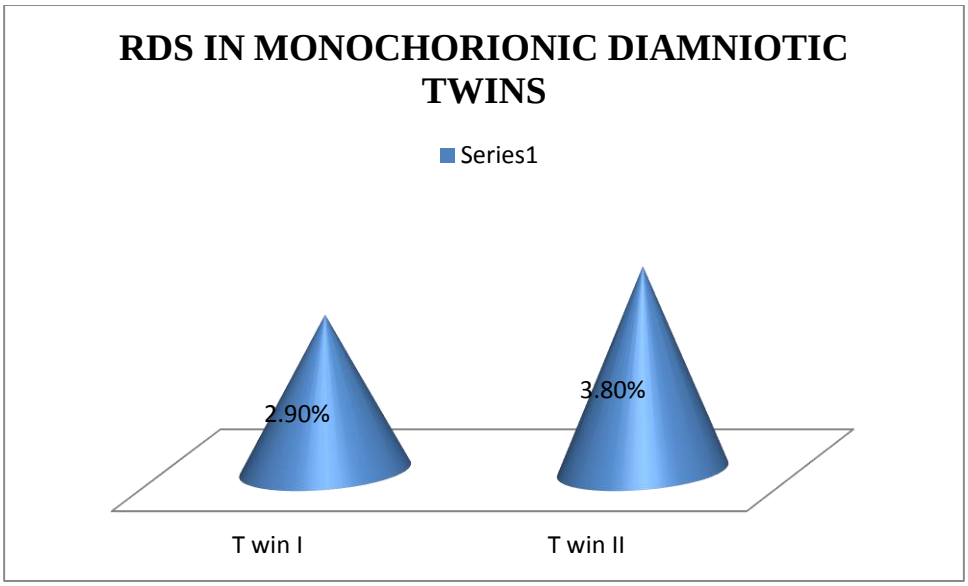
On the whole the mortality was higher in twin II with statistically very significant P value of <0.000 and Chi-square value of 39.18.

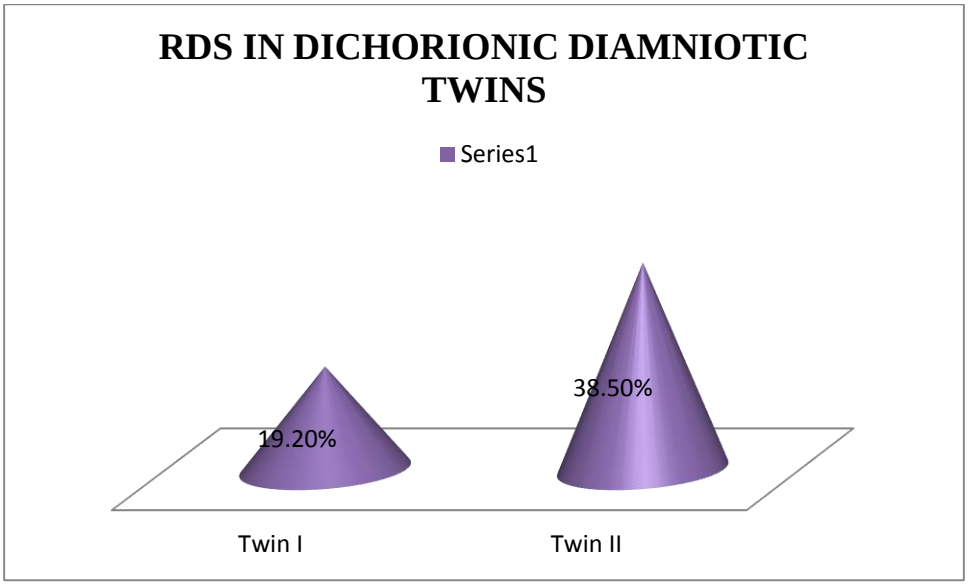
Table No:26 RDS – CHORIONICITY

S.No	RDS	TWIN - I				TWIN - II			
		CHORIONICITY				CHORIONICITY			
		1 M C M A	2 M C D A	3 D C D A	TOTAL	1 M C M A	2 M C D A	3 D C D A	TOTAL
1	NO	4 (3.8)	17 (16.3)	60 (57.7)	81 (77.9)	3 (2.9)	17 (16.3)	40 (38.5)	60 (57.7)
2	YES	0 (.0)	3 (2.9)	20 (19.2)	23 (22.1)	0 (.0)	4 (3.8)	40 (38.5)	44 (42.3)
		X^2=2.11 , df=2 , p<.348				X^2=8.79 , df=2 , p<.012			

Table shows 3.8% of monochorionic diamniotic twins II having RDS compared to only 2.9% of twin I of Monochorionic diamniotic group.

Of the Dichorionic Diamniotic type, 38.5% have RDS among twin II compared to 19.2% of twin I of same group.





This data is significant by the chisquare test to value of 8.79 but moderately significant p value of <0.12

Table No:27 IVH - CHORIONICITY

S.No	IVH	TWIN - I				TWIN - II			
		CHORIONICITY				CHORIONICITY			
		1 M C M A	2 M C D A	3 D C D A	TOTAL	1 M C M A	2 M C D A	3 D C D A	TOTAL
1	NO	3 (2.9)	20 (19.2)	80 (76.9)	103 (99.0)	3 (2.9)	21 (20.2)	79 (76.0)	103 (99.0)
2	YES	1 (1.0)	0 (.0)	0 (.0)	1 (1.0)	0 (.0)	0 (.0)	1 (1.0)	1 (1.0)
		X^2=25.24 , df=2 , p<.000				X^2=.303 , df=2 , p<.859			

1% of Monochorionic monoamniotic twins I and 1% of dichorionic diamniotic twin II have IVH.

Table No:28 NEED FOR MECHANICAL VENTILATION – CHORIONICITY

S.No	MECH VENT	TWIN - I				TWIN – II			
		CHORIONICITY				CHORIONICITY			
		1 M C M A	2 M C D A	3 D C D A	TOTAL	1 M C M A	2 M C D A	3 D C D A	TOTAL
1	NO	3 (2.9)	13 (12.5)	51 (49.0)	67 (64.4)	2 (1.9)	15 (14.4)	40 (38.5)	57 (54.8)
2	YES	1 (1.0)	7 (6.7)	29 (27.9)	37 (35.6)	1 (1.0)	6 (5.8)	40 (38.5)	47 (45.2)
		X^2=.214 , df=2 , p<.899				X^2=3.25 , df=2 , p<.196			

Need for mechanical ventilation is similar in Monochorionic monoamniotic group of twin I and twin II which is 1%

Of the monochorionic diamniotic group, 8.7% of twin I needed mechanical ventilation, whereas only 5.8% of twin II needed it

38% of dichorionic diamniotic group of twin II needed ventilator support compared to 27.9% of twin I of the same group, which is statistically significant with chisquare value of 3.25

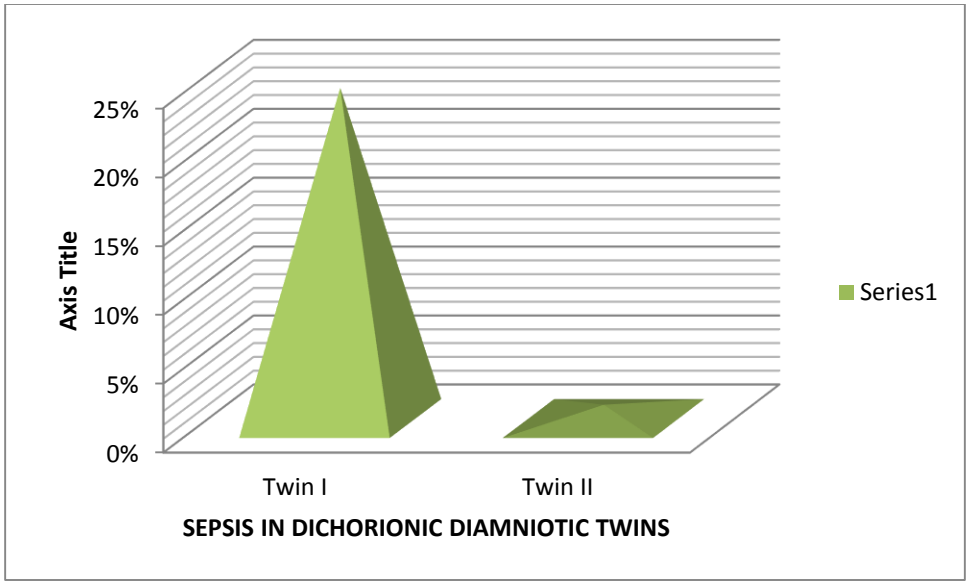
Table No:29 SEPSIS - CHORIONICITY

S.No	SEPSIS	TWIN - I				TWIN – II			
		CHORIONICITY				CHORIONICITY			
		1 M C M A	2 M C D A	3 D C D A	TOTAL	1 M C M A	2 M C D A	3 D C D A	TOTAL
1	NO	4 (3.8)	16 (15.4)	56 (53.8)	76 (73.1)	2 (1.9)	18 (17.3)	79 (76.0)	99 (95.2)
2	YES	0 (.0)	4 (3.8)	24 (23.1)	28 (26.9)	1 (1.0)	3 (2.9)	1 (1.0)	5 (4.8)
		X^2=2.34 , df=2 , p<.309				X^2=11.66 , df=2 , p<.003			

1% of twin II of monochorionic monoamniotic group have sepsis whereas none of the twin I of the same group have it.

In the Monochorionic diamniotic group, 3.8% of twin I have sepsis compared to 2.9% of twin II

24% of twin I of dichorionic diamniotic group have sepsis compared to 1% of twin II



Totally the analysis is significant with Chisquare value of 11.66 and p value less than 0.003, showing higher incidence of sepsis in twin I compared to twin II

Table No:30 SEIZURE - CHORIONICITY

S.No	SEIZURE	TWIN - I				TWIN – II			
		CHORIONICITY				CHORIONICITY			
		1 M C M A	2 M C D A	3 D C D A	TOTAL	1 M C M A	2 M C D A	3 D C D A	TOTAL
1	NO	4 (3.8)	19 (18.3)	77 (74.0)	100 (96.2)	3 (2.9)	20 (19.2)	80 (76.9)	103 (99.0)
2	YES	0 (.0)	1 (1.0)	3 (2.9)	4 (3.8)	0 (.0)	1 (1.0)	0 (.0)	1 (1.0)
		X^2=.234 , df=2 , p<.890				X^2=3.99 , df=2 , p<.136			

1% of both twin I and twin II of monochorionic diamniotic group have seizure.

Twin I of dichorionic diamniotic group have higher incidence of 2.9% of seizure whereas none of the dichorionic diamniotic group twin II have seizure episodes

Table No:31 HOSPITAL STAY -CHORIONICITY

S.No	HOSPITAL STAY	TWIN - I				TWIN – II			
		CHORIONICITY				CHORIONICITY			
		1 M C M A	2 M C D A	3 D C D A	TOTAL	1 M C M A	2 M C D A	3 D C D A	TOTAL
1	<7 DAYS	4 (3.8)	17 (16.3)	60 (57.7)	81 (77.9)	3 (2.9)	15 (14.4)	61 (58.7)	79 (76.0)
2	>7 DAYS	0 (.0)	3 (2.9)	20 (19.2)	23 (22.1)	0 (.0)	6 (5.8)	19 (18.3)	25 (24.0)
		X^2=2.11 , df=2 , p<.348				X^2=1.18 , df=2 , p<.552			

5.8% of twin II of monochorionic diamniotic group had hospital stay longer compared to 2.9% of twin I of the same group.

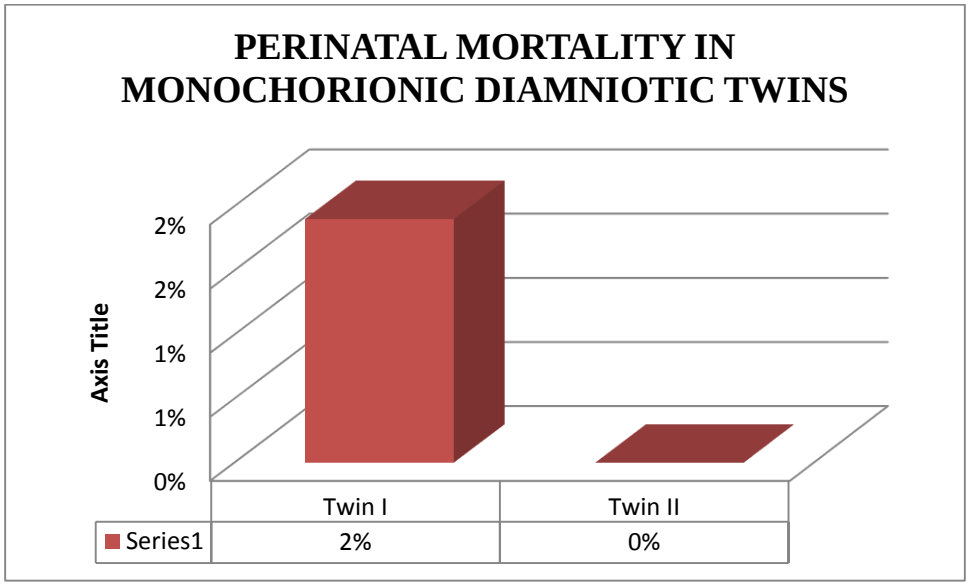
19.2% of twin I of dichorionic diamniotic group had longer hospital stay compared to 18.3% of twin II of the same group.

Table No:32 MORTALITY - CHORIONICITY

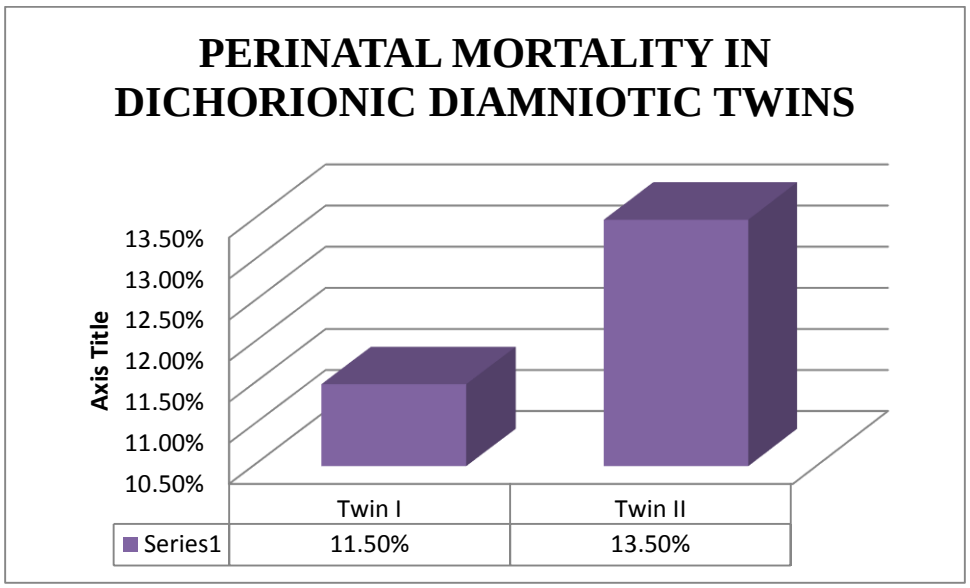
		TWIN - I				TWIN – II			
S.No	**MORTALITY**	**CHORIONICITY**				**CHORIONICITY**			
		1 M C M A	**2 M C D A**	**3 D C D A**	**TOTAL**	**1 M C M A**	**2 M C D A**	**3 D C D A**	**TOTAL**
1	NO	3 (2.9)	18 (17.3)	68 (65.4)	89 (85.6)	2 (1.9)	21 (20.2)	66 (63.5)	89 (85.6)
2	YES	1 (1.0)	2 (1.9)	12 (11.5)	15 (14.4)	1 (1.0)	0 (.0)	14 (13.5)	15 (14.4)
		X^2=.701 , df=2 , p<.704				X^2=5.02 , df=2 , p<.081			

Both twin I and twin II have 1% incidence of perinatal mortality in the monochorionic mono amniotic group

1.9% of twin I of monochorionic diamniotic group have perinatal mortality, whereas none of the twin II of the same group have mortality



13.5% of Twin II of the dichorionic diamniotic group have higher mortality compared to twin I with mortality rate of 11.5% in the dichorionic diamniotic group



Therefore Twin II have higher mortality rates based on their difference in the chorionicity compared to twin I with statistically significant chisquare value of 5.02

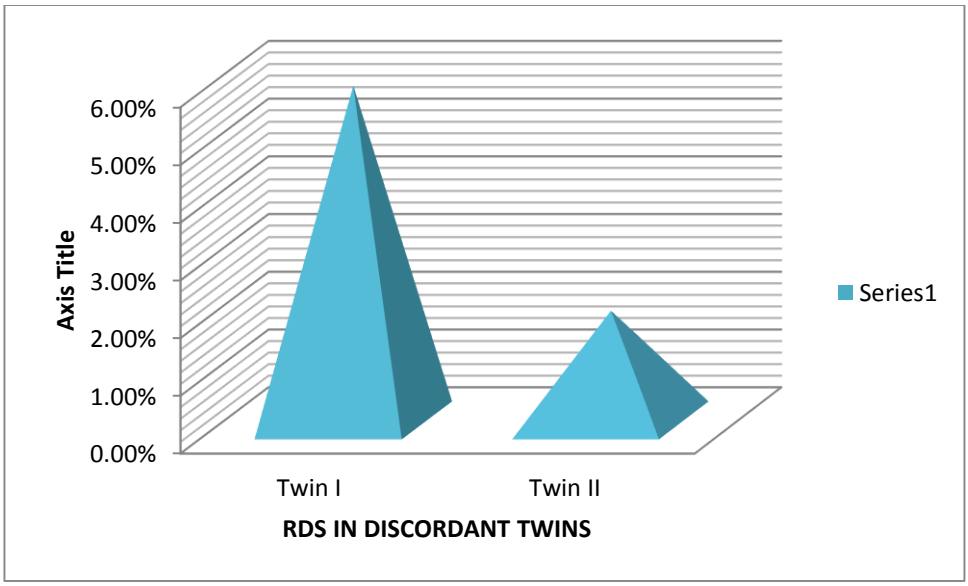
Table No:33 RDS - DISCORDANCY

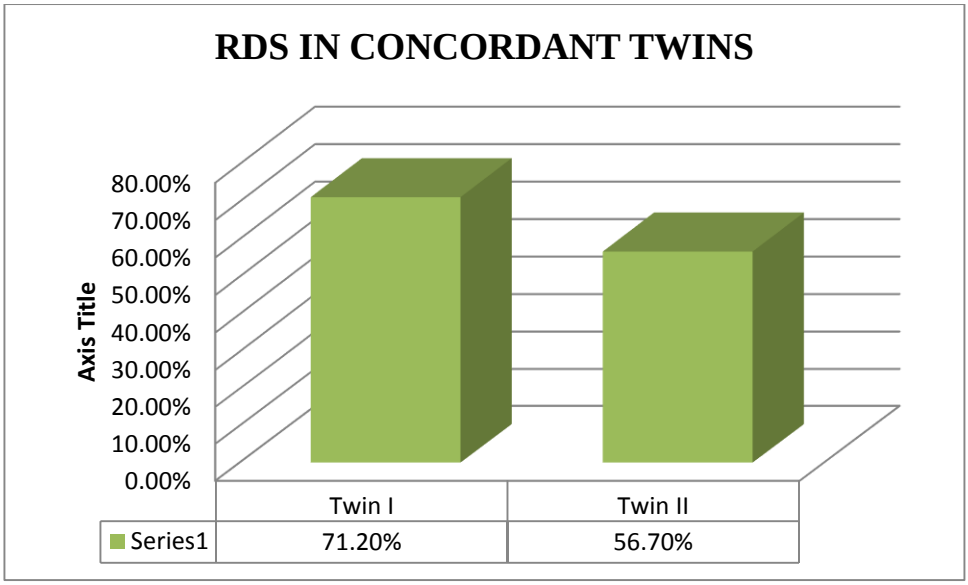
S.No	RDS	TWIN - I DISCORDANCY			TWIN - II DISCORDANCY		
		1 NO	2 YES	TOTAL	1 NO	2 YES	TOTAL
1	NO	59 (56.7)	7 (6.7)	81 (77.9)	74 (71.2)	1 (1.0)	60 (57.7)
2	YES	21 (20.2)	2 (1.9)	23 (22.2)	38 (36.5)	6 (5.8)	44 (42.3)
		X^2=.000 , df=1 , p<.994			X^2=5.79 , df=1 , p<.016		

5.8%(6/104 cases)of discordant Twin II have RDS compared to 1.9%(2/104 cases)of discordant Twin I.

Discordant Twin II have statistically higher incidence of RDS compared to discordant Twin I evident by the Chi-square value of 5.79.

Out of the concordant twins twin II have higher 71.2%(7 4/104 cases) incidence of RDS compared to Twin I with 56,7%(59/104 cases).





Canpolat FE et al,2006, 266 pairs of twins were studied with mean gestational age of 33 weeks,birth weight of 1890 gms studied and found that the discordant Twin had higher incidence of RDS either first or second born or male.

Table No:34 IVH - DISCORDANCY

S.No	IVH	TWIN - I			TWIN - II		
		DISCORDANCY			DISCORDANCY		
		1 NO	2 YES	TOTAL	1 NO	2 YES	TOTAL
1	NO	94 (90.4)	9 (8.70	103 (99.0)	96 (92.3)	7 (6.7)	103 (99.0)
2	YES	1 (1.0)	0 (.0)	1 (1.0)	1 (1.0)	0 (.0)	1 (1.0)
		X^2=.096 , df=1 , p<.757			X^2=.073 , df=1 , p<.787		

1% of each discordant Twins I and II have IVH.

Table No 35: NEED FOR MECHANICAL VENTILATION - DISCORDANCY

S.No	MECH VENT	TWIN - I			TWIN - II		
		DISCORDANCY			DISCORDANCY		
		1 NO	2 YES	TOTAL	1 NO	2 YES	TOTAL
1	NO	62 (59.6)	5 (4.8)	67 (64.4)	56 (53.8)	1 (1.0)	57 (54.8)
2	YES	33 (31.7)	4 (3.8)	37 (35.6)	41 (39.4)	6 (5.8)	47 (45.2)
		X^2=.338 , df=1 , p<.561			X^2=4.97 , df=1 , p<.026		

5.8%(6/104 cases) of discordant Twin II have the need for mechanical ventilation compared to 3.8%(4/104 cases) of discordant Twin I.

Table No:36 SEPSIS - DISCORDANCY

S.No	SEPSIS	TWIN - I DISCORDANCY			TWIN - II DISCORDANCY		
		1 NO	2 YES	TOTAL	1 NO	2 YES	TOTAL
1	NO	71 (68.3)	5 (4.8)	76 (73.1)	92 (88.5)	7 (6.7)	99 (95.2)
2	YES	24 (23.10	4 (3.8)	28 (26.9)	5 (4.8)	0 (.0)	5 (4.8)
		X^2=1.53 , df=1 , p<.215			X^2=.379 , df=1 , p<.538		

Table shows 3.8%(4/104 cases) of discordant twin I have sepsis ,were as none of the discordant Twin II have sepsis.

Table No:37 SEIZURE - DISCORDANCY

S.No	SEIZURE	TWIN - I			TWIN - II		
		DISCORDANCY			DISCORDANCY		
		1 NO	2 YES	TOTAL	1 NO	2 YES	TOTAL
1	NO	91 (87.5)	9 (8.7)	100 (96.2)	96 (92.3)	7 (6.7)	103 (99.0)
2	YES	4 (3.8)	0 (.0)	4 (3.8)	1 (1.0)	0 (.0)	1 (1.0)
		X^2=.394 , df=1 , p<.530			X^2=.073 , df=1 , p<.787		

Discordant twin I and Twin II both did not have any seizure occurrence.

Table No:38 HOSPITAL STAY - DISCORDANCY

S.No	HOSPITAL STAY	TWIN – I			TWIN - II		
		DISCORDANCY			DISCORDANCY		
		1 NO	2 YES	TOTAL	1 NO	2 YES	TOTAL
1	NO	73 (70.2)	8 (7.7)	81 (77.9)	75 (72.1)	4 (3.8)	79 (76.0)
2	YES	22 (21.2)	1 (1.0)	23 (22.1)	22 (21.2)	3 (2.9)	25 (24.0)
		X^2=.693 , df=1 , p<.405			X^2=1.45 , df=1 , p<.228		

2.9%(3/104 cases) of discordant Twin II have prolonged hospital stay compared to 1%(1/104 cases) of discordant Twin I with statistical significance of 1.45 value of Chi-square test.

Table No:39 MORTALITY - DISCORDANCY

S.No	MORTALITY	TWIN - I			TWIN - II		
		DISCORDANCY			DISCORDANCY		
		1 NO	2 YES	TOTAL	1 NO	2 YES	TOTAL
1	NO	81 (77.9)	8 (7.7)	89 (85.6)	83 (79.8)	6 (5.8)	89 (85.6)
2	YES	14 (13.5)	1 (1.0)	15 (14.4)	14 (13.5)	1 (1.0)	15 (14.4)
		X^2=.088 , df=1 , p<.767			X^2=.000 , df=1 , p<.991		

Discordant Twin I and discordant Twin II have equal mortality ratio of 1%(1/104 cases).

CHART-1

AGE DISTRIBUTION

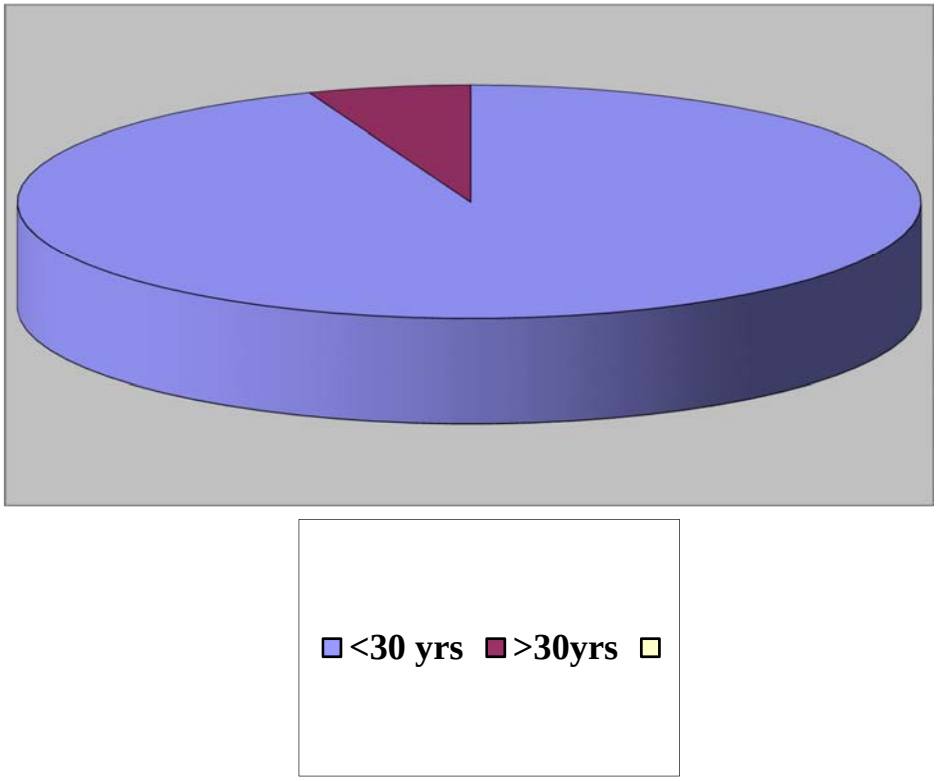


CHART-2

SEX OF THE BABY

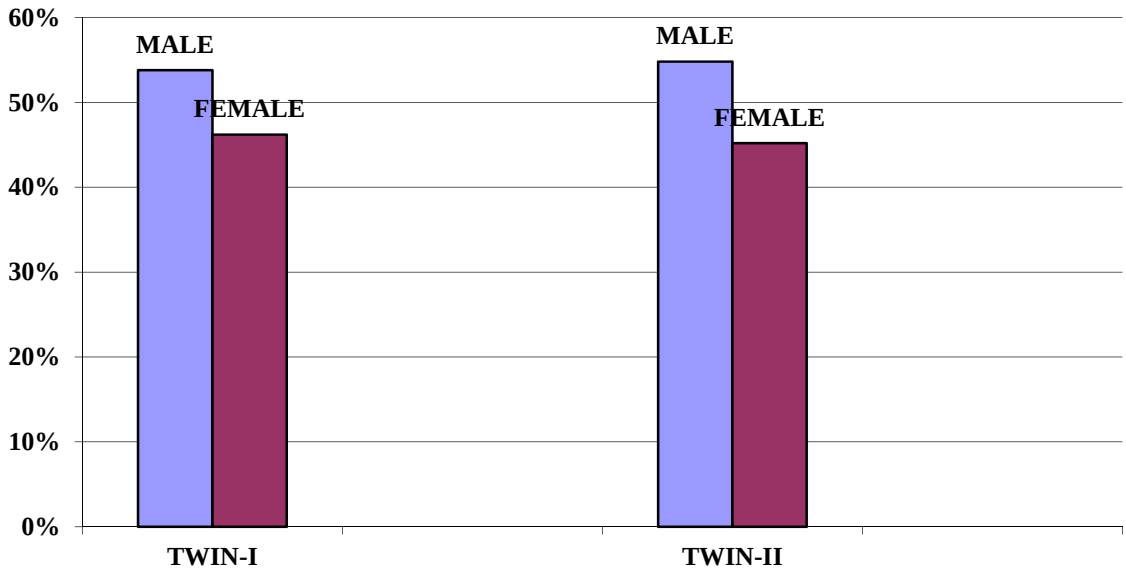


CHART-3

PARITY

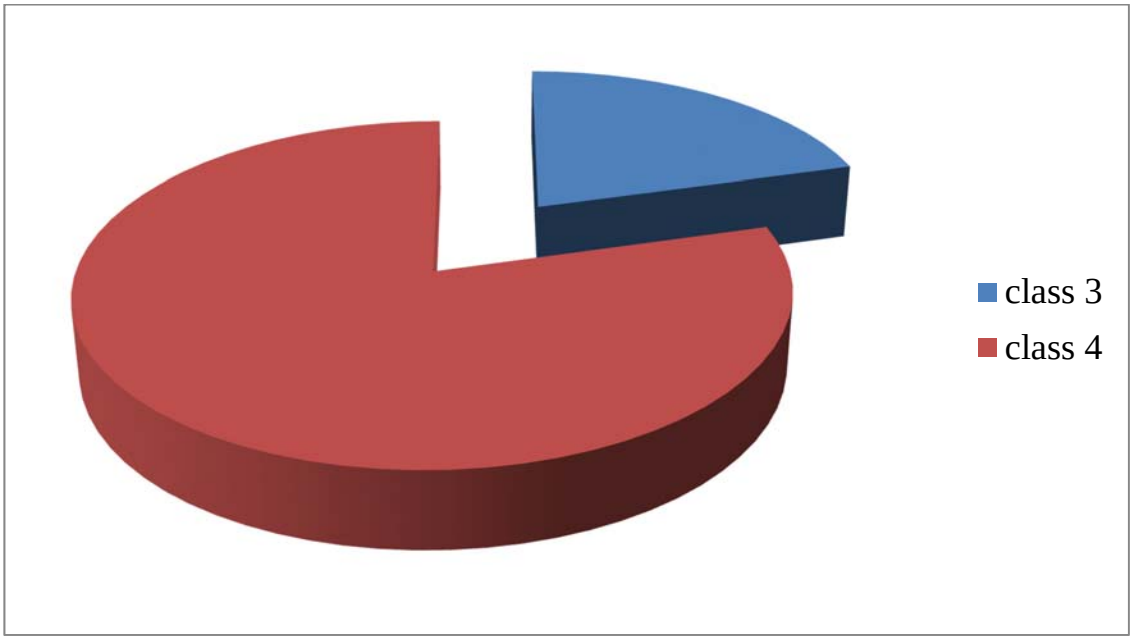
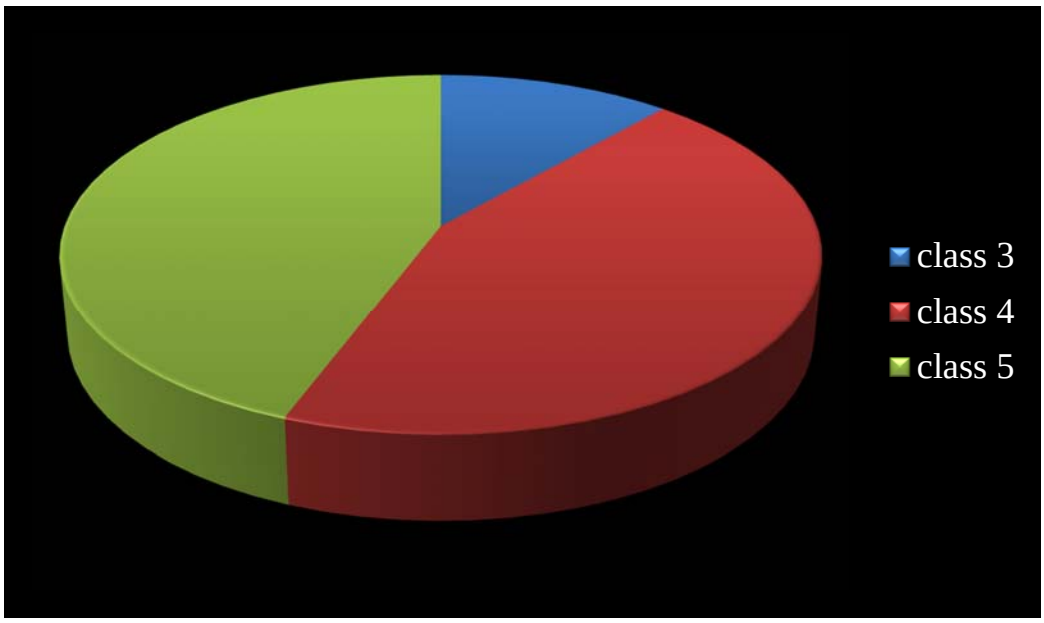
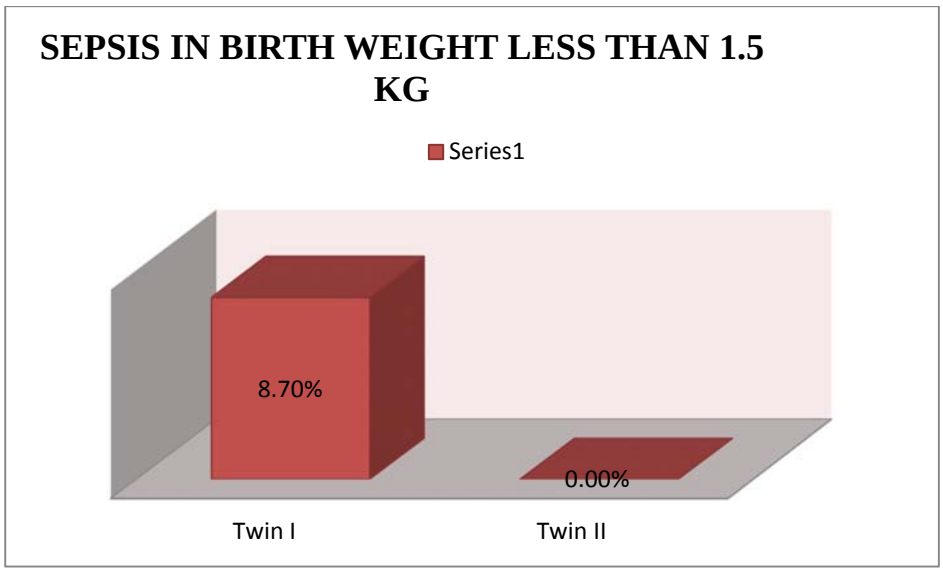
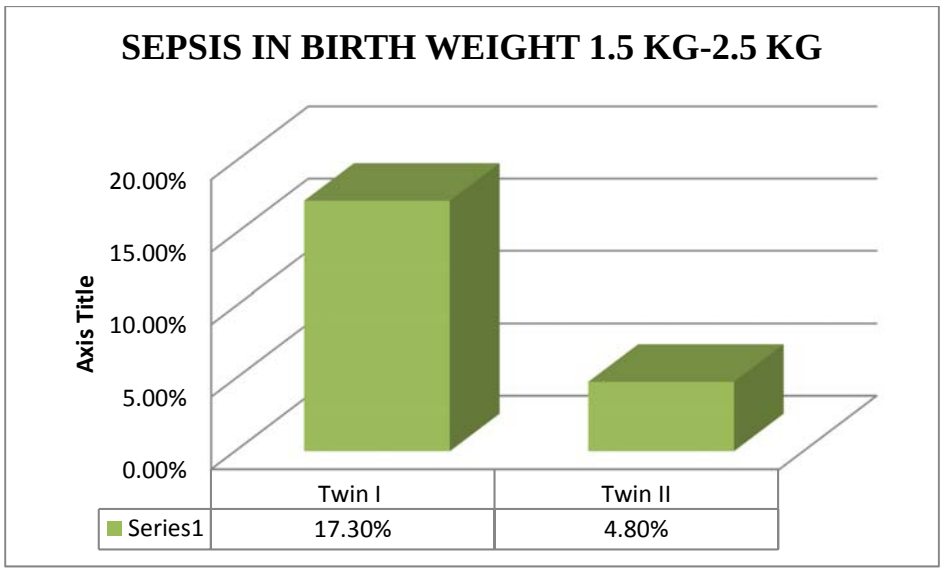


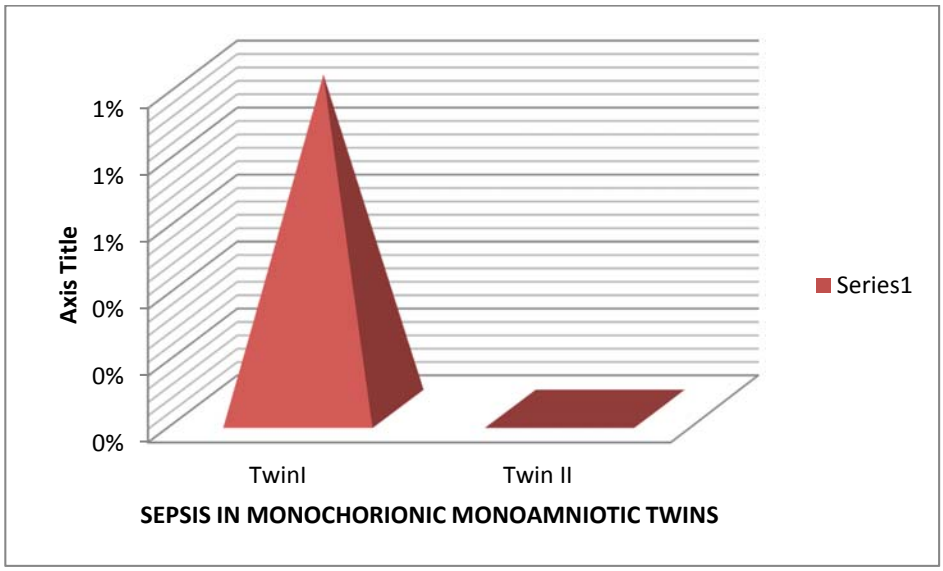
CHART-4

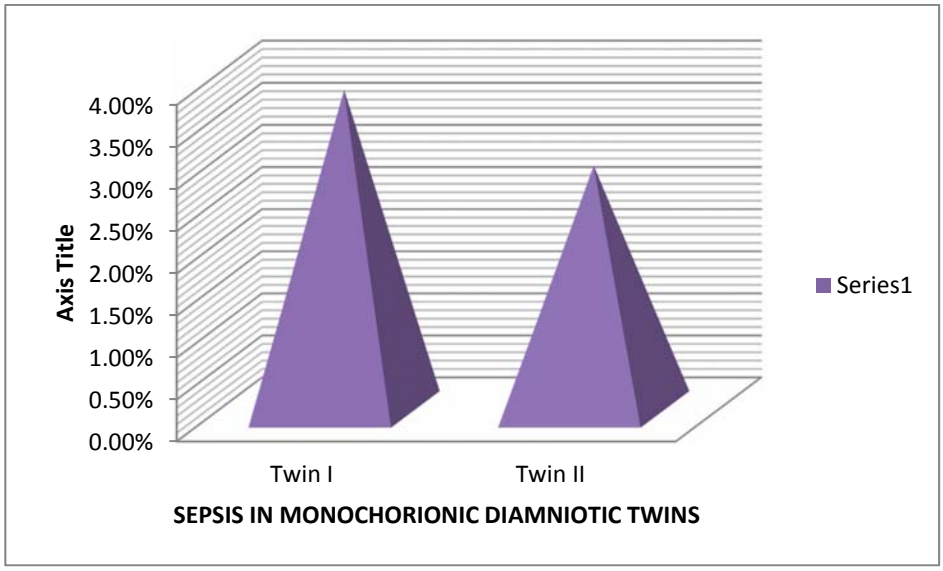
SOCIO ECONOMIC STATUS




SEPSIS IN BIRTH WEIGHT LESS THAN 1.5 KG
Series1
8.70%
0.00%
Twin I
Twin II


SEPSIS IN BIRTH WEIGHT 1.5 KG-2.5 KG
Axis Title
20.00%
15.00%
10.00%
5.00%
0.00%
Twin I
Twin II
Series1
17.30%
4.80%


1%
1%
1%
0%
0%
0%
Axis Title
TwinI
Twin II
Series1
SEPSIS IN MONOCHORIONIC MONOAMNIOTIC TWINS


4.00%
3.50%
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
Axis Title
Twin I
Twin II
Series1
SEPSIS IN MONOCHORIONIC DIAMNIOTIC TWINS

Discussion

The aim of the study is to compare the perinatal morbidity and mortality of the presenting twin to its co-twin, based on

- Gestational age at the time of delivery
- Mode of delivery
- Birth weight
- Chorionicity
- Discordancy

The study included the women of age 18- 40 years carrying twin pregnancies, admitted to the labour ward with signs of labour, of gestational age >28 weeks.

PATIENT DEMOGRAPHIES

In our study incidence of twin was more common in the age group below 30 years with multiparity being the higher incident twin mothers.

Which is similar to the resuls of **chaudary S et al 2001** with 100 pairs of twins with 64.2% multigravida.

Even though Twin pregnancy is more common in elderly women,in our study higher occurrence is seen among the women of age group less than 30 years.

This is in accordance with study by **HFEA et.al., National collaborating centre for women's and children's health,RCOG feb 2004** and a study by **gulrukh qazi et al**,were 152 pairs of twins studied and mean maternal age was 28.07.

Male sex was most common in both twin groups. The subjects in our study were majority from the low socioeconomic group.

MORBIDITY FACTORS

Morbidity among the twin I and twin II was analysed using factors such as

- Development of respiratory distress syndrome
- Interventricular haemorrhage
- Need for mechanical ventilation
- Sepsis

- Seizure
- Duration of hospital stay

RDS

Respiratory distress is more common in twin II compared to twin I with respect to

1. Gestational age (<32 weeks, 32-36 weeks, >36 weeks),

   Which is similar to **arch dis child fetal neonatal et al 2001**,were 2000pairs of twins were studied,68% of twin II had respiratory distress compared to 32% of twinI of gestational age less than 32 weeks.

2. Whether the twins were delivered through labour natural or LSCS

   Ilhab et al., studied 295 twins and found 25% of twin II had RDS on contrary to 4.4% of twinI.

3. With birth weight of <1.5kg, 1.5-2.5kg, >2.5kg groups,

   Were **prins et al.,** noted 49.5% twin II having RDS in 200 pairs of twins of low birth weight.

4. In monochorionic, monoamniotic, monochorionic-diamniotic, DCDA twins,

   Robertson et al.,studied 200 pairs of twins and noted 78% RDS in twin II.

5. As well as discordant and non-discordant twins,

This is in contrary to **canpolat FE et al 2006** who noted 56% of incidence of RDS in discordant twin II compared to 34% of discordant twin I.

This is in agreement with the study conducted by **Chen Et al.,** who studied144 pairs of twins ,comparing RDS,Apgar scores,growth restriction, bronchodysplasia, came out with similar results.

INTERVENTRICULAR HAEMORRHAGE

We have only two cases of IVH, which fell in the gestational age group of 32-36 weeks, both delivered through labour natural, both of weight range 1.5-2.5kg, one was MCMA and the other was DCDA, both were non-discordant but both had perinatal mortality.

zeilitin et al 2004 reported 78% of IVH in twin II of 104 twin pairs studied with wt < 1.5 kg.

IVH is unpredictable, outcome is poor.

A Warthins studied 113 pairs of twins and found IVH and perinatal mortality did not vary significantly between Twin I and Twin II

NEED FOR VENTILATION

The need for mechanical ventilation is higher in twin II in our study, in all the gestational age groups(< 32 weeks,32-36 weeks,>36 weeks) admitted for labour, main reason for the need for ventilation being the higher incidence of respiratory distress in the twin II compared to twin I.

Australia and newzealand neonatal network collected data from 301 twin pairs,out of the 80 twins' with RDS 69 were twin II and they needed O2 support and ventilator care.

Even though twin II, delivered through lscs (along with twin I or cesarean section for the twin II alone), LN, the need for ventilator support is higher in twin II.

This is supported by **Young et al.,** in the previous studies where 406 pairs of twins were studied and 62% of twin II delivered by labour natural had higher need for ventilator support.

In low birth weight twins also, need for mechanical ventilation is low in twin I group compared to twin II which needed it with birth weight <1.5kg, 1.5-2.5kg groups.

The results are similar to research by **D Hacking et al.,**who studied 602 premature twins,252 in the group including birth weight 1000-1500gms,153 cases of twin II had RDS,needed surfactant.

In our study higher number of DCDA twin II needs ventilatory support, due to the increased delivery interval of twin II.

It is contrary to studies by Nakauo and Tahemura et al., where 146 twin pairs were studied showing only 0.8% of DCDA twins(both I &II) needed ventilator support.

Discordant twin II due to respiratory distress have increased ventilator need compared to twin I.

On the whole there is increased need for ventilation among the twin II, which may be probably due to the increased incidence of RDS in twin II as discussed before.

SEPSIS

Sepsis is higher in incidence in twin I in comparison with its in-uteromate, with regard to the gestational age of <32 weeks, 32-36weeks, >36 weeks.

Fleischer et al.,1990., studied 204 twins of gestational age >36 weeks and found higher- 28% incidence in Twin I.

Interestingly and naturally, twin I delivered through labour natural had higher sepsis compared to twin II. Also with cesarean section, twin I is highest in sepsis.

Anwar H et al., studied 517 twins and came out with 87% sepsis in twin I.

Twin I with low birth weight(<1.5kg) have higher rates of sepsis in comparison to twin II of the same weight, even with appropriate weight for age twin I stands first in sepsis.

Seibre et al., 1997 has studied 406 twins and came out with results of 51% sepsis in low birth weight twin I compared to LBW twin II.

Chorionicity has got no relation to sepsis, but still in our study DCDA twin I have higher sepsis compared to twin II.

Robertson et al., also came out with the same results as our study, he further substantiated that, higher susceptibility of infection and its related complications may be due to the fact that twin I is more prone to ascending infection due to its proximity to birth canal.

Total sepsis in twin I-25.96%,with PROM-77.7%.(<24 hrs-52.4%,>24 hrs-25.3%)

Only 4.8% of twin II have sepsis,with PROM 100%.(<24hrs-87.3%,>24 hrs-23.7%)

SEIZURE

In our study irrespective of all gestational age groups seizure occurrence is more common in the twin I group. This may be attributed to the higher incidence of sepsis in twin I.

Tis is similar to results in the study by Ihab M usta MD.,were 517 pairs of twins was studied and 9% of twin had seizure and this was significantly higher.

Both among the twins delivered through labour natural and lscs seizure is higher in twin I. The incidence of seizure did not vary with mode of delivery.

In birth weight<2.5kg seizure occurrence peaked in twin I group, so the root cause for the seizure is suspected to be sepsis as it is higher in twin I irrespective of the other parameters in the study.

Surprisingly, DCDA twin I have higher seizure, this once again goes well with higher incidence of sepsis in DCDA twin I.

No seizure is reported in discordant twins

This is in coherence with prior study made by **Wyshak and White et al.,** who compared 28 studies on twins and identified twin I at risk of seizure due to sepsis.

HOSPITAL STAY

In our study, even though perinatal period is one week after delivery, both the twins were followed upto a period of one month.

Hospital stay is higher in twin II with gestational age <32 weeks and 32-36 weeks, the reason being higher incidence of RDS.

Twin I had prolonged hospital stay with regard to the mode of delivery, especially those delivered through labour natural stayed longer.

Considering birth weight, twin II of all birth weight groups have prolonged hospital stay.

Even though monochorionic twins have more complications compared to dichorionic twins, ironically DCDA twin I have to stay longer compared to twin II.

Discordant twin II have longer hospital stay compared to discordant twin I.

Eskes et al ., studies were 207 twin pairs were studied also came with difference in the outcome of hospital stay among twin I and twin II, this supports our study.

MORTALITY

With regard to gestational age <32 weeks, mortality is significantly higher in twin II, where as there is no significant difference in mortality rates in the other two groups such as 32-36 weeks gestational age and >36 weeks gestational age.

This is similar to the study by **Mc carthy et al.,** who found no significant increase in mortality risk in Twin II by his study of 7001 live born twins.

According to the mode of delivery, in labour natural group twin I had little higher mortality compared to twin II of the same group, whereas in lscs twin II had mortality but none of twin I died.

This is in contrary to the study by **Ziadeh &badia et al.,** were 108 pairs of twins were studied,he found regardless of the mode of delivery,based on birth weight and gestational age mortality was higher for twin II.

Twin II with low birth weight <1.5kg have little higher mortality than twin I of the same weight, same with regard to birth weight 1.5-2.5kg. Above 2.5kg there was no mortality in both groups. Therefore birthweight has greater impact on the perinatal mortality.

Wyshan &White et al studied 208 pairs of twins and found Twin II with 7.3% mortality and Twin I with 5.6% perinatal mortality.

DCDA twin II have increased perinatal mortality compared to DCDA twin I, the major cause of mortality being RDS. Rest of chorionic twins have insignificant mortality in our study.

Both the discordant twin I and twin II died in our study, leaving us no way to compare in this perspective.

This is similar to study by **syeda babol mazhar et al,** were uncorrected ANMC was 114.5 for discordant twin II versus 43.9 for discordant twin I in 1000 twin births.

In the conclusion we need to say that the outcome of mortality of first born twin is similar to that of the second born twin regardless of gestational age, mode of delivery, birth weight, chorionicity and discordancy. Eventhough this finding is in partly odd with the British studies of reporting- four to five fold increase in mortality of twin II, our material mainly included low risk labours since pregnancies with diagnosis of complications(medical and obstetric complications) were excluded, therefore the results are not necessarily at odds. However the first twin is at risk of infection and related complications whereas second twin is at risk of RDS.

The final outcome is similar to study made by **I hab M Usta MD,Anwar H Nassar MD,Johnny Awwad MD** who came out with results-when twin pairs with affected twin were considered it becomes apparent that presenting twin is at increased risk for infection-related morbidities whereas the co-twin is at risk for the other complications.

CONCLUSION:

- Twin pregnancy is more common among women of age less than 30years in our study.
- There is male preponderance in both Twin I and Twin II.
- Multiparous women in our study are higher incident twin mothers.
- Study group entirely belongs to low socio-economic status.
- RDS is more common in Twin II,hence need for mechanical ventilation is more in Twin II compared to Twin II.
- SEPSIS is more common in Twin I with PROM contributing to the major cause of sepsis.
- Thus the perinatal mortality is similar in both Twin I and Twin II but the cause different and being SEPSIS and RDS respectively.
- The study helps to analyse the difference in the outcome of both the twins & to find out various factors which influence it, in the era of sonography, fetal monitors, judicious use of inducing agents, increased & prompt cesarean delivery.
- This will be helpful in counselling women with twin gestations in future.

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PROFORMA

COMPARITIVE STUDY ON PERINATAL MORBIDIY AND MORTALITY OF PRESENTING TWIN TO ITS CO-TWIN

NAME: IP.NO:

AGE : OCCUPATION:

ADDRESS: OBSTETRIC CODE:

D.O.ADMN: D.O.DIS:

BOOKED AT: NO.OF AN VISITS(&LOCATION):

PHC	GH	CORP	MEDI. COLL	PRIVATE

REFERRAL(IF ANY): BLOOD GROUP:

LMP: E.D.D:

GESTATIONAL AGE IN WEEKS:

PRESENTING COMPLAINTS

C/O Labour pains

H/o Draining PV

Menstrual History

Attained menarche-

Cycles- regular / irregular

L.M.P-

Marital History

Married for the past - years

Consanguinity -

Treatment for infertility-

Obstetric History:

Obstetric code-

Previous pregnancies-

Present Pregnancy- I Trimester-

II-Trimester-

III-Trimester-

Personal History:

Veg / Mixed

Life-Style –

Family history:

H/o Twin delivery in family – YES / NO(maternal/paternal)

General Examination:

Height- Weight- BMI-

Anaemia- Pedal edema-

Thyroid- Breasts-

Spine- Gait-

Vitals:

PR: BP:

SYSTEMIC EXAMINATION

CVS: RS:

P/A:

P/V:

SHOW		
DILATATION		
EFFACEMENT		
STATION		
CONSISTENCY		
OS POSITION		
MEMBRANE		
COLOUR OF LIQUOR		
PELVIS		

INVESTIGATIONS:

Hemoglobin: TC,DC,ESR:

Blood Sugar: Urea:

Sr.Creatinine: Urine-Alb-

Sug-

Dep-

VCTC- GCT/GTT-

OBSTETRIC USG:

DATE	TRIMESTER	FINDINGS	USG-DONE BY-SONOLOGIST /OBSTETRICIAN

GESTATIONAL AGE BY USG:

MATERNAL RISK FACTORS: ANEMIA

PIH

GDM

OBESITY

LONG PERIOD OF INFERTILITY

PREVIOUS LSCS

OTHERS

LABOUR DETAILS:

1.PRESENTATION : TWIN-I: TWIN-II:

2.ONSET: **a)**Spontaneous onset YES/NO

b)Elective C/S YES/NO

3.PROGRESS :

a)Normal progress of labour YES/NO

b) Induction for Twin -II

1)Oxytocin YES/NO

2)ARM- Spontaneous / artificial
COLOUR OF LIQUOR-

3)Any intervention for Twin-II: YES/NO

INTRAPARTUM COMPLICATIONS:

VARIABLE	YES	NO
CORD PROLAPSE		
HAND PROLAPSE		
PROM		
FETAL DISTRESS		
MECONIUM STAINED LIQUOR		
ABRUPTIO PLACENTA		
PPH		

VARIABLE	TWIN I	TWIN II
ADMISSION- DELIVERY INTERVAL		
ACCELERATION-DELIVERY INTERVAL		
TIME OF DELIVERY		
MODE OF DELIVERY		
TWIN-TWIN DELIVERY INTERVAL		
CHORIONICITY(BY PLACENTAL EXMN)		
BABY DETAILS SEX		
BIRTH WEIGHT		
APGAR 1’ 5’		
GEST.AGE-CLINICAL EXMN BY PAEDIATRICIAN		
ADMISSION TO NICU		
TYPE OF MORBIDITY		
NO.OF HOSPITAL STAY		
IN NICU,OBSERVATION		
CPAP		
INCUBATOR		
VENTILATOR		

S.NO	IP NO	AGE	SEX-TW-II	PARITY	SE STATUS(CLASS)	GESTATIONAL AGE	MODE OF DELIVERY	BIRTH WEIGHT	CHORIONICITY	DISCORDANCY	RDS	IVH	MECH VENT	SEPSIS	SEIZURE	HOSPITAL STAY	MORTALITY
1	77851	25	F	MULTI	4	37	LSCS	2.4	DCDA	NO	NO	NO	NO	NO	NO	0	NO
2	23706	20	F	PRIMI	4	34	LN	2.25	DCDA	NO	NO	NO	NO	NO	NO	0	NO
3	75239	31	M	MULTI	5	33	LSCS	1.8	MCDA	NO	NO	NO	YES	YES	NO	13	NO
4	23561	26	M	MULTI	4	35	LSCS	1.75	DCDA	NO	YES	NO	YES	NO	NO	5	NO
5	80135	32	M	MULTI	5	35	LSCS	2.1	MCDA	NO	NO	NO	NO	NO	NO	0	NO
6	82313	28	F	PRIMI	4	36	LSCS	2.1	DCDA	NO	NO	NO	NO	NO	NO	0	NO
7	76005	28	M	MULTI	5	34	LN	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
8	83006	23	M	PRIMI	4	38	LSCS	2.4	MCDA	NO	NO	NO	NO	NO	NO	0	NO
9	91199	24	M	MULTI	5	34	LN	1.75	DCDA	NO	YES	NO	YES	NO	NO	5	NO
10	25681	28	F	PRIMI	4	34	LSCS	2	MCDA	NO	NO	NO	NO	NO	NO	0	NO
11	78027	19	M	PRIMI	5	30	LN	750	DCDA	NO	YES	NO	YES	NO	NO	1	YES
12	75901	18	M	PRIMI	4	30	LN	1.75	DCDA	NO	YES	NO	YES	NO	NO	25	NO
13	83557	24	M	MULTI	5	33	LN	2	DCDA	NO	YES	NO	YES	NO	NO	8	NO
14	25724	21	F	PRIMI	3	32	LSCS	1.25	DCDA	YES	YES	NO	YES	NO	NO	7	NO
15	78715	25	M	MULTI	5	38	LSCS	2.5	MCDA	NO	NO	NO	NO	NO	NO	0	NO
16	93569	25	F	MULTI	4	33	LN	2	DCDA	NO	YES	NO	YES	NO	NO	15	NO
17	17218	20	F	PRIMI	5	38	LN	2.1	MCDA	NO	NO	NO	NO	NO	NO	0	NO
18	18075	22	M	MULTI	4	38	LN	2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
19	27401	27	F	MULTI	5	36	LSCS	2.3	DCDA	NO	NO	NO	NO	NO	NO	0	NO
20	12690	27	F	MULTI	4	37	LSCS	1.6	DCDA	YES	YES	NO	YES	NO	NO	7	NO
21	14007	20	M	PRIMI	5	32	LN	1.6	MCMA	NO	NO	NO	YES	YES	NO	6	YES
22	58724	21	F	PRIMI	5	39	LSCS	2.75	DCDA	NO	NO	NO	NO	NO	NO	0	NO
23	73925	26	M	MULTI	4	36	LSCS	2	MCDA	NO	NO	NO	NO	NO	NO	0	NO
24	17206	24	F	MULTI	5	38	LN	2	MCDA	NO	NO	NO	NO	NO	NO	0	NO
25	14945	25	M	PRIMI	3	38	LSCS	2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
26	13770	24	M	MULTI	5	34	LSCS	1.5	DCDA	NO	YES	NO	YES	NO	NO	15	NO
27	75044	24	F	PRIMI	4	34	LSCS	2.25	DCDA	NO	NO	NO	NO	NO	NO	0	NO
28	75249	22	M	PRIMI	5	35	LN	2.4	MCDA	NO	YES	NO	YES	NO	NO	15	NO
29	73514	20	F	MULTI	4	36	LN	1.7	DCDA	NO	YES	NO	YES	NO	NO	11	NO
30	72609	27	F	MULTI	5	36	LSCS	1.8	DCDA	NO	YES	NO	NO	NO	NO	1	NO
31	74801	27	M	MULTI	4	36	LN	1.2	MCDA	NO	YES	NO	YES	NO	NO	1	NO
32	74573	30	F	MULTI	5	33	LN	1.2	DCDA	NO	YES	NO	YES	NO	NO	4	YES
33	11782	22	M	MULTI	4	36	LN	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
34	74224	19	M	PRIMI	5	32	LN	1.25	MCDA	NO	YES	NO	YES	NO	NO	8	NO
35	72137	23	M	MULTI	4	32	LSCS	1.75	MCDA	NO	NO	NO	NO	NO	NO	0	NO
36	23669	27	M	MULTI	5	36	LSCS	3	DCDA	NO	NO	NO	NO	NO	NO	0	NO
37	24045	19	M	PRIMI	5	37	LN	2.6	DCDA	NO	NO	NO	NO	NO	NO	0	NO
38	23472	22	F	MULTI	4	36	LN	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
39	15218	21	M	PRIMI	5	37	LN	2.4	MCDA	NO	NO	NO	NO	YES	YES	11	NO
40	71921	28	M	MULTI	4	30	LN	1.4	DCDA	NO	YES	NO	YES	NO	NO	30	YES
41	76806	24	M	PRIMI	3	36	LSCS	2.3	DCDA	YES	NO	NO	NO	NO	NO	0	NO
42	94415	27	M	MULTI	4	33	LN	1.75	MCDA	NO	NO	NO	YES	YES	NO	16	NO
43	11674	20	M	MULTI	5	38	LSCS	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
44	28419	27	F	MULTI	4	38	LN	2.65	DCDA	NO	NO	NO	NO	NO	NO	0	NO
45	91949	23	M	PRIMI	3	37	LN	2.1	DCDA	NO	NO	NO	NO	NO	NO	0	NO
46	91606	25	F	MULTI	4	34	LN	1.9	DCDA	NO	NO	NO	NO	NO	NO	0	NO
47	34277	25	M	MULTI	5	38	LN	1.8	DCDA	NO	YES	NO	YES	NO	NO	32	NO
48	36321	24	F	MULTI	4	36	LSCS	2.6	DCDA	NO	NO	NO	NO	NO	NO	0	NO
49	40794	23	M	MULTI	5	38	LN	2.25	DCDA	NO	NO	NO	NO	NO	NO	0	NO
50	37724	27	M	PRIMI	3	38	LN	2.25	DCDA	NO	NO	NO	NO	NO	NO	0	NO

51	40453	20	F	PRIMI	5	36	LSCS	1.3	DCDA	YES	YES	NO	YES	NO	NO	8	YES
52	24570	23	F	MULTI	4	35	LN	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
53	77866	21	M	PRIMI	5	35	LSCS	1.75	DCDA	NO	YES	NO	YES	NO	NO	11	NO
54	24419	24	M	MULTI	5	34	LN	2.25	DCDA	NO	NO	NO	NO	NO	NO	0	NO
55	15734	24	F	PRIMI	4	36	LN	1.75	DCDA	NO	YES	NO	YES	NO	NO	5	NO
56	15451	22	F	PRIMI	5	32	LN	1	DCDA	NO	YES	NO	YES	NO	NO	1	YES
57	15287	20	M	PRIMI	4	38	LN	2.25	MCMA	NO	NO	NO	NO	NO	NO	0	NO
58	80698	22	M	MULTI	3	36	LSCS	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
59	82973	21	M	MULTI	4	34	LN	2.16	DCDA	NO	NO	NO	NO	NO	NO	0	NO
60	82817	20	M	MULTI	3	32	LN	770	DCDA	NO	YES	NO	YES	NO	NO	1	YES
61	94821	28	F	MULTI	5	37	LSCS	1.9	DCDA	NO	YES	NO	YES	NO	NO	9	NO
62	81486	26	F	MULTI	5	38	LN	1.8	DCDA	YES	YES	NO	YES	NO	NO	3	NO
63	76261	25	F	PRIMI	4	37	LN	2.25	DCDA	NO	NO	NO	NO	NO	NO	0	NO
64	98425	19	F	PRIMI	5	30	LSCS	1.25	DCDA	NO	YES	NO	YES	NO	NO	1	YES
65	11693	27	M	MULTI	3	36	LN	2.2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
66	93472	26	F	PRIMI	4	33	LN	1.5	DCDA	NO	NO	YES	YES	NO	NO	7	YES
67	28963	23	F	PRIMI	3	38	LSCS	2.8	DCDA	NO	NO	NO	NO	NO	NO	0	NO
68	29497	22	M	MULTI	5	38	LSCS	2.75	DCDA	NO	NO	NO	NO	NO	NO	0	NO
69	80449	23	F	MULTI	4	32	LN	1.5	DCDA	NO	YES	NO	YES	NO	NO	9	NO
70	80068	22	M	MULTI	3	34	LN	2.4	DCDA	NO	NO	NO	NO	NO	NO	0	NO
71	25804	27	F	MULTI	5	38	LN	2.4	DCDA	NO	YES	NO	YES	NO	NO	7	NO
72	89898	35	F	MULTI	4	30	LN	1.5	DCDA	NO	YES	NO	YES	NO	NO	8	YES
73	84552	19	F	PRIMI	5	29	LN	900	DCDA	NO	YES	NO	YES	NO	NO	2	YES
74	21852	20	M	PRIMI	4	38	LN	2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
75	23913	26	M	PRIMI	5	34	LSCS	1.8	DCDA	NO	YES	NO	YES	NO	NO	12	NO
76	93364	25	M	MULTI	4	34	LN	2	MCDA	NO	NO	NO	NO	NO	NO	0	NO
77	90033	24	M	PRIMI	5	30	LN	1.6	DCDA	NO	YES	NO	YES	YES	NO	23	YES
78	10576	30	F	MULTI	4	38	LN	1.75	MCDA	YES	YES	NO	YES	NO	NO	8	NO
79	76064	22	F	MULTI	5	38	LN	2.6	DCDA	NO	NO	NO	NO	NO	NO	0	NO
80	32586	23	F	MULTI	4	37	LN	1.75	DCDA	NO	NO	NO	NO	NO	NO	0	NO
81	21371	18	F	PRIMI	5	34	LN	1.4	DCDA	NO	YES	NO	YES	NO	NO	4	NO
82	21852	20	M	PRIMI	4	28	LN	1	DCDA	NO	YES	NO	YES	NO	NO	1	YES
83	19296	23	F	PRIMI	4	30	LN	1.6	DCDA	NO	YES	NO	YES	NO	NO	13	NO
84	21056	24	M	MULTI	5	38	LSCS	2.3	DCDA	NO	NO	NO	NO	NO	NO	0	NO
85	20871	26	F	MULTI	4	36	LSCS	1.3	DCDA	YES	YES	NO	YES	NO	NO	9	NO
86	23178	27	M	PRIMI	5	38	LSCS	3.2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
87	43256	26	F	PRIMI	4	38	LN	2.6	DCDA	NO	NO	NO	NO	NO	NO	0	NO
88	34285	27	F	MULTI	3	32	LN	1.6	DCDA	NO	YES	NO	YES	NO	NO	7	NO
89	28675	25	M	PRIMI	4	36	LN	2.4	MCDA	NO	NO	NO	NO	NO	NO	0	NO
90	29608	20	F	PRIMI	5	30	LN	1.4	DCDA	NO	YES	NO	YES	NO	NO	9	YES
91	35734	23	F	MULTI	3	34	LSCS	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
92	78621	27	M	PRIMI	4	36	LN	2.6	DCDA	NO	NO	NO	NO	NO	NO	0	NO
93	67543	31	M	PRIMI	5	38	LSCS	3	MCMA	NO	NO	NO	NO	NO	NO	0	NO
94	86521	32	M	MULTI	4	32	LN	1.5	DCDA	NO	YES	NO	YES	NO	NO	8	YES
95	76541	36	M	MULTI	5	36	LSCS	2.5	MCDA	NO	NO	NO	NO	NO	NO	0	NO
96	25643	23	M	PRIMI	4	35	LN	2.7	DCDA	NO	NO	NO	NO	NO	NO	0	NO
97	36793	29	F	MULTI	5	38	LSCS	2.7	MCDA	NO	NO	NO	NO	NO	NO	0	NO
98	28915	19	F	PRIMI	4	33	LN	1.8	DCDA	NO	YES	NO	YES	NO	NO	5	NO
99	37489	26	M	MULTI	4	34	LN	2	DCDA	NO	YES	NO	YES	NO	NO	7	NO
100	91877	22	F	PRIMI	5	36	LN	2	DCDA	NO	YES	NO	YES	NO	NO	11	NO
101	840017	23	M	PRIMI	4	38	LSCS	2.4	MCDA	NO	NO	NO	NO	NO	NO	0	NO
102	92217	24	M	MULTI	5	34	LN	1.75	DCDA	NO	YES	NO	YES	NO	NO	5	NO
103	17216	20	F	PRIMI	5	38	LN	2.1	MCDA	NO	NO	NO	NO	NO	NO	0	NO
104	37688	26	M	MULTI	4	34	LN	2	DCDA	NO	YES	NO	YES	NO	NO	7	NO

S.NO	IP NO	AGE	SEX-TW-I	PARITY	SE STATUS(CLASS)	GESTATIONAL AGE	MODE OF DELIVERY	BIRTH WEIGHT	CHORIONICITY	DISCORDANCY	RDS	IVH	MECH VENT	SEPSIS	SEIZURE	HOSPITAL STAY(NICU-IN DAYS	MORTALITY
1	77851	25	F	MULTI	4	37	LSCS	2.1	DCDA	NO	NO	NO	NO	NO	NO	0	NO
2	23706	20	M	PRIMI	4	34	LN	2.5	DCDA	NO	NO	NO	NO	YES	NO	5	NO
3	75239	31	M	MULTI	5	33	LSCS	2	MCDA	NO	YES	NO	YES	NO	NO	11	NO
4	23561	26	M	MULTI	4	35	LSCS	2.25	DCDA	NO	NO	NO	NO	NO	NO	0	NO
5	80135	32	M	MULTI	5	35	LSCS	2.3	MCDA	NO	NO	NO	NO	NO	NO	0	NO
6	82313	28	F	PRIMI	4	36	LSCS	2.2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
7	76005	28	F	MULTI	5	34	LN	1.75	DCDA	YES	NO	NO	NO	YES	NO	4	NO
8	83006	23	M	PRIMI	4	38	LSCS	2.4	MCDA	NO	NO	NO	NO	NO	NO	0	NO
9	91199	24	M	MULTI	5	34	LN	2.25	DCDA	NO	NO	NO	NO	NO	NO	0	NO
10	25681	28	F	PRIMI	4	34	LSCS	2.25	MCMA	NO	NO	NO	NO	NO	NO	0	NO
11	78027	19	M	PRIMI	5	30	LN	800	DCDA	NO	YES	NO	YES	NO	NO	1	YES
12	75901	18	M	PRIMI	4	30	LN	1.25	DCDA	NO	NO	NO	YES	YES	NO	20	NO
13	83557	24	M	MULTI	5	33	LN	1.6	DCDA	NO	YES	NO	YES	NO	NO	8	NO
14	25724	21	F	PRIMI	3	32	LSCS	1.7	DCDA	NO	NO	NO	NO	NO	NO	5	NO
15	78715	25	F	MULTI	5	38	LSCS	2.4	MCDA	NO	NO	NO	NO	NO	NO	0	NO
16	93569	25	F	MULTI	4	33	LN	1.3	DCDA	YES	NO	NO	NO	YES	NO	15	NO
17	17218	20	F	PRIMI	5	38	LN	2.25	MCDA	NO	NO	NO	NO	NO	NO	0	NO
18	18075	22	F	MULTI	4	38	LN	2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
19	27401	27	F	MULTI	5	36	LSCS	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
20	12690	27	F	MULTI	4	37	LSCS	2.5	DCDA	YES	NO	NO	NO	NO	NO	0	NO
21	14007	20	M	PRIMI	5	32	LN	1.5	MCMA	NO	NO	YES	YES	NO	NO	2	YES
22	58724	21	M	PRIMI	5	39	LSCS	2.75	DCDA	NO	NO	NO	NO	NO	NO	0	NO
23	73925	26	M	MULTI	4	36	LSCS	2.1	MCDA	NO	NO	NO	NO	NO	NO	0	NO
24	17206	24	F	MULTI	5	38	LN	2.2	MCDA	NO	NO	NO	NO	NO	NO	0	NO
25	14945	25	F	PRIMI	3	38	LSCS	2.2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
26	13770	24	F	MULTI	5	34	LSCS	1.4	DCDA	NO	NO	NO	YES	YES	YES	21	NO
27	75044	24	M	PRIMI	4	34	LSCS	2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
28	75249	22	M	PRIMI	5	35	LN	1.75	MCDA	YES	NO	NO	YES	YES	NO	5	NO
29	73514	20	M	MULTI	4	36	LN	2.2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
30	72609	27	M	MULTI	5	36	LSCS	2.3	DCDA	NO	NO	NO	NO	NO	NO	0	NO
31	74801	27	F	MULTI	4	36	LN	1.9	MCDA	NO	YES	NO	YES	NO	NO	1	YES
32	74573	30	F	MULTI	5	33	LN	1.5	DCDA	NO	YES	NO	YES	NO	NO	5	YES
33	11782	22	M	MULTI	4	36	LN	2.3	DCDA	NO	NO	NO	NO	NO	NO	0	NO
34	74224	19	M	PRIMI	5	32	LN	1.75	MCDA	NO	YES	NO	YES	NO	NO	8	NO
35	72137	23	M	MULTI	4	32	LSCS	2.2	MCDA	NO	NO	NO	NO	NO	NO	0	NO
36	23669	27	F	MULTI	5	36	LSCS	2.7	DCDA	NO	NO	NO	NO	NO	NO	0	NO
37	24045	19	M	PRIMI	5	37	LN	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
38	23472	22	F	MULTI	4	36	LN	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
39	15218	21	M	PRIMI	5	37	LN	1.8	MCDA	NO	NO	NO	YES	YES	YES	15	NO
40	71921	28	M	MULTI	4	30	LN	1.2	DCDA	NO	NO	NO	YES	YES	NO	34	YES
41	76806	24	M	PRIMI	3	36	LSCS	3.5	DCDA	YES	NO	NO	NO	NO	NO	3	NO
42	94415	27	F	MULTI	4	33	LN	1.2	MCDA	NO	NO	NO	YES	YES	NO	3	YES
43	11674	20	M	MULTI	5	38	LSCS	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
44	28419	27	F	MULTI	4	38	LN	2.3	DCDA	NO	NO	NO	NO	NO	NO	0	NO
45	91949	23	M	PRIMI	3	37	LN	2.1	DCDA	NO	NO	NO	NO	NO	NO	0	NO
46	91606	25	F	MULTI	4	34	LN	2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
47	34277	25	F	MULTI	5	38	LN	800	DCDA	YES	YES	NO	YES	NO	NO	4	YES
48	36321	24	F	MULTI	4	36	LSCS	3	DCDA	NO	NO	NO	NO	NO	NO	0	NO
49	40794	23	M	MULTI	5	38	LN	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
50	37724	27	F	PRIMI	3	38	LN	2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
51	40453	20	F	PRIMI	5	36	LSCS	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
52	24570	23	F	MULTI	4	35	LN	2.25	DCDA	NO	NO	NO	NO	NO	NO	0	NO
53	77866	21	M	PRIMI	5	35	LSCS	1.9	DCDA	NO	NO	NO	YES	YES	NO	16	NO
54	24419	24	M	MULTI	5	34	LN	1.9	DCDA	NO	NO	NO	NO	YES	NO	5	NO
55	15734	24	M	PRIMI	4	36	LN	1.6	DCDA	NO	NO	NO	NO	YES	NO	5	NO

56	15451	22	M	PRIMI	5	32	LN	1.1	DCDA	NO	YES	NO	YES	NO	NO	6	YES
57	15287	20	M	PRIMI	4	38	LN	2.5	MCMA	NO	NO	NO	NO	NO	NO	0	NO
58	80698	22	F	MULTI	3	36	LSCS	2.2	DCDA	NO	YES	NO	YES	NO	NO	5	NO
59	82973	21	M	MULTI	4	34	LN	1.9	DCDA	NO	NO	NO	NO	NO	NO	5	NO
60	82817	20	M	MULTI	3	32	LN	900	DCDA	NO	YES	NO	YES	YES	YES	1	YES
61	94821	28	F	MULTI	5	37	LSCS	2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
62	81486	26	F	MULTI	5	38	LN	2.75	DCDA	NO	NO	NO	NO	NO	NO	0	NO
63	76261	25	F	PRIMI	4	37	LN	2.75	DCDA	NO	NO	NO	NO	NO	NO	0	NO
64	98425	19	F	PRIMI	5	30	LN	1.6	DCDA	NO	NO	NO	YES	YES	NO	16	NO
65	11693	27	M	MULTI	3	36	LN	2.1	DCDA	NO	NO	NO	NO	NO	NO	0	NO
66	93472	26	F	PRIMI	4	33	LN	1.5	DCDA	NO	NO	NO	YES	YES	NO	13	NO
67	28963	23	F	PRIMI	3	38	LSCS	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
68	29497	22	M	MULTI	5	38	LSCS	2.7	DCDA	NO	NO	NO	NO	NO	NO	0	NO
69	80449	23	F	MULTI	4	32	LN	2	DCDA	NO	NO	NO	YES	YES	NO	9	NO
70	80068	22	M	MULTI	3	34	LN	1.8	DCDA	YES	YES	NO	YES	NO	NO	6	NO
71	25804	27	M	MULTI	5	38	LN	3	DCDA	NO	NO	NO	NO	NO	NO	0	NO
72	89898	35	M	MULTI	4	30	LN	1.5	DCDA	NO	NO	NO	YES	YES	NO	15	NO
73	84552	19	M	PRIMI	5	29	LN	1.1	DCDA	NO	YES	NO	YES	NO	NO	1	YES
74	21852	20	F	PRIMI	4	38	LN	1.9	DCDA	NO	YES	NO	YES	YES	YES	9	YES
75	23913	26	F	PRIMI	5	34	LSCS	1.3	DCDA	NO	NO	NO	YES	YES	NO	8	NO
76	93364	25	M	MULTI	4	34	LN	2	MCDA	NO	NO	NO	NO	NO	NO	0	NO
77	90033	24	M	PRIMI	5	30	LN	1.6	DCDA	NO	NO	NO	YES	YES	NO	28	NO
78	10576	30	F	MULTI	4	38	LN	2.7	MCDA	YES	NO	NO	YES	YES	NO	7	NO
79	76064	22	M	MULTI	5	38	LN	2.8	DCDA	NO	NO	NO	NO	NO	NO	0	NO
80	32586	23	M	MULTI	4	37	LN	2.5	DCDA	NO	NO	NO	NO	NO	NO	0	NO
81	21371	18	M	PRIMI	5	34	LN	1.6	DCDA	NO	YES	NO	YES	YES	NO	4	YES
82	21852	20	F	PRIMI	4	28	LN	900	DCDA	NO	YES	NO	YES	NO	NO	9	YES
83	19296	23	M	PRIMI	4	30	LN	1.5	DCDA	NO	YES	NO	YES	NO	NO	15	YES
84	21056	24	F	MULTI	5	38	LSCS	2.25	DCDA	NO	NO	NO	NO	NO	NO	0	NO
85	20871	26	F	MULTI	4	36	LSCS	2	DCDA	NO	NO	NO	NO	NO	NO	0	NO
86	23178	27	M	PRIMI	5	38	LSCS	2.2	DCDA	YES	NO	NO	NO	NO	NO	0	NO
87	43256	26	M	PRIMI	4	38	LN	2.8	DCDA	NO	NO	NO	NO	NO	NO	0	NO
88	34285	27	F	MULTI	3	32	LN	1.8	DCDA	NO	YES	NO	YES	YES	NO	7	NO
89	28675	25	M	PRIMI	4	36	LN	2.2	MCDA	NO	NO	NO	NO	NO	NO	0	NO
90	29608	20	M	PRIMI	5	30	LN	1.1	DCDA	NO	YES	NO	YES	YES	NO	9	YES
91	35734	23	M	MULTI	3	34	LSCS	2.6	DCDA	NO	NO	NO	NO	NO	NO	0	NO
92	78621	27	F	PRIMI	4	36	LN	2.4	DCDA	NO	NO	NO	NO	NO	NO	0	NO
93	67543	31	M	PRIMI	5	38	LSCS	2.75	MCMA	NO	NO	NO	NO	NO	NO	0	NO
94	86521	32	F	MULTI	4	32	LN	1.6	DCDA	NO	YES	NO	YES	YES	NO	9	NO
95	76541	36	M	MULTI	5	36	LSCS	3	MCDA	NO	NO	NO	NO	NO	NO	0	NO
96	25643	23	F	PRIMI	4	35	LN	2.6	DCDA	NO	NO	NO	NO	NO	NO	0	NO
97	36793	29	F	MULTI	5	38	LSCS	2.8	MCDA	NO	NO	NO	NO	NO	NO	0	NO
98	28915	19	M	PRIMI	4	33	LN	2.1	DCDA	NO	YES	NO	NO	NO	NO	0	NO
99	37489	26	F	MULTI	4	34	LN	1.8	DCDA	NO	YES	NO	YES	YES	NO	8	NO
100	91877	22	M	PRIMI	5	36	LN	2.2	DCDA	NO	YES	NO	YES	YES	NO	13	NO
101	83016	24	M	PRIMI	4	38	LSCS	2.4	MCDA	NO	NO	NO	NO	NO	NO	0	NO
102	91178	24	M	MULTI	5	34	LN	2.25	DCDA	NO	NO	NO	NO	NO	NO	0	NO
103	17219	20	F	PRIMI	5	38	LN	2.25	MCDA	NO	NO	NO	NO	NO	NO	0	NO
104	34816	26	F	MULTI	4	34	LN	1.8	DCDA	NO	YES	NO	YES	YES	NO	8	NO

Ref. No. 23308/E4/2/2013

Govt. Rajaji Hospital,
Madurai.20. Dated: 24.12.2013

Institutional Review Board / Independent Ethics Committee.
Dr. N. Mohan, M.S., F.I.C.S., F.A.I.S.,
Dean, Madurai Medical College &
Govt Rajaji Hospital, Madurai 625020. **Convenor**

Sub: Establishment-Govt. Rajaji Hospital, Madurai-20-
Ethics committee-Meeting Minutes- for December 2013
Approved list -regarding.

The Ethics Committee meeting of the Govt. Rajaji Hospital, Madurai was held on 18.12.2013, Wednesday at 10.00 am to 12.00.noon at the Anaethesia Seminar Hall, Govt. Rajaji Hospital, Madurai. The following members of the committee have attended the meeting.

1.Dr. V. Nagarajan, M.D., D.M (Neuro) Ph: 0452-2629629 Cell.No 9843052029	Professor of Neurology (Retired) D.No.72, Vakkil New Street, Simmakkal, Madurai -1	Chairman
2. Dr.Mohan Prasad , M.S M.Ch Cell.No.9843050822 (Oncology)	Professor & H.O.D of Surgical Oncology(Retired) D.No.72, West Avani Moola Street, Madurai -1	Member Secretary
3. Dr. I. Jeyaraj, M.S., (Anatomy) Cell.No 9566211947	Director & Professor Institute of Anatomy /V.P Madurai Medical College	Member
4. Dr. Parameswari M.D (Pharmacology) Cell.No.9994026056	Director of Pharmacology Madurai Medical College	Member
5. Dr.S. Vadivel Murugan, MD., (Gen.Medicine) Cell.No 9566543048	Professor of Medicine Madurai Medical College	Member
6. Dr.S. Meenakshi Sundaram, MS (Gen.Surgery) Cell.No 9842138031	Professor & H.O.D of Surgery i/c Madurai Medical College	Member
7. Mrs. Mercy Immaculate Rubalatha, M.A., Med., Cell. No. 9367792650	50/5, Corporation Officer's quarters, Gandhi Museum Road, Thamukam, Madurai-20	Member
8. Thiru..Pala. .Ramasamy , BA.,B.L., Cell.No 9842165127	Advocate, D.No.72.Palam Station Road, Sellur, Madurai -2	Member
9. Thiru. P.K.M. Chelliah ,B.A Cell.No 9894349599	Businessman, 21 Jawahar Street, Gandhi Nagar, Madurai-20	Member

The following Project was approved by the committee

..2..

Name of P.G.	Course	Name of the Project	Remarks
Dr. Preethi Jennifer	PG in M.s., (O&G) Madurai Medical College and Government Rajaji Hospital, Madurai.	Comparative study on perinatal morbidity and mortality of presenting twin to its co-twin at Govt. Rajaji Hospital, Madurai.	Approved

Please note that the investigator should adhere the following: She/He should get a detailed informed consent from the patients/participants and maintain it Confidentially.

1. She/He should carry out the work without detrimental to regular activities as well as without extra expenditure to the institution or to Government.
2. She/He should inform the institution Ethical Committee, in case of any change of study procedure, site and investigation or guide.
3. She/He should not deviate the area of the work for which applied for Ethical clearance. She/He should inform the IEC immediately, in case of any adverse events or Serious adverse reactions.
4. She/He should abide to the rules and regulations of the institution.
5. She/He should complete the work within the specific period and if any Extension of time is required He/She should apply for permission again and do the work.
6. She/He should submit the summary of the work to the Ethical Committee on Completion of the work.
7. She/He should not claim any funds from the institution while doing the work or on completion.
8. She/He should understand that the members of IEC have the right to monitor the work with prior intimation.

Member Secretary **Chairman**
Ethical Committee

DEAN/Convenor
Govt. Rajaji Hospital,
Madurai- 20.

24/12/13

To
The above Applicant
-thro. Head of the Department concerned

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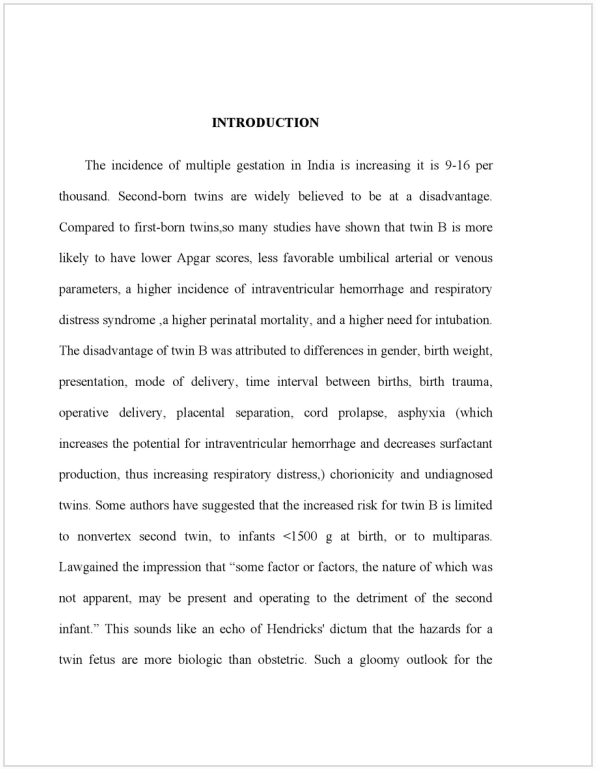

INTRODUCTION

The incidence of multiple gestation in India is increasing it is 9-16 per thousand. Second-born twins are widely believed to be at a disadvantage. Compared to first-born twins,so many studies have shown that twin B is more likely to have lower Apgar scores, less favorable umbilical arterial or venous parameters, a higher incidence of intraventricular hemorrhage and respiratory distress syndrome ,a higher perinatal mortality, and a higher need for intubation. The disadvantage of twin B was attributed to differences in gender, birth weight, presentation, mode of delivery, time interval between births, birth trauma, operative delivery, placental separation, cord prolapse, asphyxia (which increases the potential for intraventricular hemorrhage and decreases surfactant production, thus increasing respiratory distress,) chorionicity and undiagnosed twins. Some authors have suggested that the increased risk for twin B is limited to nonvertex second twin, to infants <1500 g at birth, or to multiparas. Lawgained the impression that "some factor or factors, the nature of which was not apparent, may be present and operating to the detriment of the second infant." This sounds like an echo of Hendricks' dictum that the hazards for a twin fetus are more biologic than obstetric. Such a gloomy outlook for the

INTRODUCTION

The incidence of multiple gestation in India is increasing it is 9-16 per thousand. Second-born twins are widely believed to be at a disadvantage. Compared to first-born twins,so many studies have shown that twin B is more likely to have lower Apgar scores, less favorable umbilical arterial or venous parameters, a higher incidence of intraventricular hemorrhage and respiratory distress syndrome ,a higher perinatal mortality, and a higher need for intubation. The disadvantage of twin B was attributed to differences in gender, birth weight, presentation, mode of delivery, time interval between births, birth trauma, operative delivery, placental separation, cord prolapse, asphyxia (which increases the potential for intraventricular hemorrhage and decreases surfactant production, thus increasing respiratory distress,) chorionicity and undiagnosed twins. Some authors have suggested that the increased risk for twin B is limited to nonvertex second twin, to infants <1500 g at birth, or to multiparas. Lawgained the impression that "some factor or factors, the nature of which was not apparent, may be present and operating to the detriment of the second