

# Determination of Birth Outcomes Among Twins

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## Abstract

**Background :** To determine the birth outcomes among twins in terms of mean gestational age, birth weight and Apgar score.

**Methods:** In this descriptive study twin pregnant women were selected among the women attending the antenatal clinic and emergency. Ultrasound for the determination of chorionicity (number of placentae i.e. either one or two placentae) of twins was performed. Cases were followed till the time of delivery. At the time of delivery birth outcomes i.e. gestational age, birth weights and Apgar scores at 1 and 5 minutes were noted on the study performed by attending obstetrician. Gestational age at the time of delivery was determined by last menstrual period or by ultrasound. Digital scale machine was used for determining birth weights in grams. Five parameters of Apgar scores, at 1 and 5 minutes, after birth were determined. These included A appearance, P pulse rate, G grimace, A activity, R respiratory effort. Each parameter was given a score of 0, 1 or 2.

**Results:** Out of 3995 deliveries 58 women (1.4%) were diagnosed as having twins. Among the twins 46.55% were mono-chorionic (MC) and 53.44% were di-chorionic (DC). The mean maternal age among twins was  $27.08 \pm 4.47$  years with a range of 20 to 40 years. Among twins mostly were multigravida (67.2%). The mean gestational age among twins was  $35.62 \pm 2.99$  weeks, with a range of 27 to 41 weeks. The mean birth weight of twins was  $2019.31 \pm 486.50$  with a range of 800 to 3000g. The mean birth weight of twin 1 was  $2065.51 \pm 486.14$  and that of twin 2 was  $1973.10 \pm 486.67$ g. The mean Apgar score of twins at 1 min was  $6.51 \pm 1.82$  with a range 0.00 to 9.00 and it was at 5mins  $7.84 \pm 1.95$  with a range 0.00 to 10.00. The mean Apgar score of twin 1 at 1 and 5 min was  $6.68 \pm 1.80$  and  $7.94 \pm 2.04$  respectively. Whereas the mean Apgar score of twin 2 was  $6.34 \pm 1.84$  at 1min and it was  $7.74 \pm 1.87$  at 5min.

**Conclusion:** Prematurity and low birth weight are the common complications of twins associated with

low Apgar score. The mean birth weight and Apgar scores of twin 1 are more than twin 2.

**Key Words:** Gestational age, Birth weight, Apgar score

## Introduction

Twin gestations account for about 1% of all pregnancies. Twins make up the vast majority (97-98%) of multiple gestations.<sup>1,4</sup> Twin pregnancy is a high risk pregnancy due to maternal and fetal complications.<sup>5</sup> Risk factors for multiple pregnancy include assisted reproductive techniques, increasing maternal age high parity, black race, maternal family history.<sup>1,2</sup>

Twins can be monozygotic or dizygotic. Monozygotic twins arise from splitting of a single fertilized ovum. Dizygotic twins result from fertilization of two ova by different spermatozoa. The incidence of monozygotic twin is constant throughout the world 3-5 per thousand births and does not vary with maternal age or parity, but may be 2-3 times higher following in vitro fertilization procedures, possibly because with these methods the architecture of the zona pellucida is altered. The incidence of dizygotic twins is 4-50 per thousand births and varies with ethnic group (up to 5 times higher in certain parts of Africa and half as high in parts of Asia), maternal age (2% at 35 years), parity (2% after four pregnancies) and method of conception (20% with ovulation induction). In the last 20 years, the rate of twinning has increased. The increase in dizygotic twins is mainly due to the widespread use of assisted reproductive techniques and the increasing maternal age. Twins gestation can be categorized on the basis of zygosity and chorionicity. Zygosity can be determined by DNA fingerprinting. Prenatally, such testing would require an invasive procedure to sample amniotic fluid (amniocentesis), placental tissue (chorionic villus sampling) or fetal blood (cordocentesis).

Determination of chorionicity can be performed by ultrasonography and relies on the assessment of fetal gender, number of placentas and characteristics of the

membrane between the two amniotic sacs. Different-sex twins are dizygotic and therefore dichorionic, but in about two-thirds of twin pregnancies the fetuses are of the same sex and these may be either monozygotic or dizygotic. If there are two separate placentas, the pregnancy is dichorionic, but, in the majority of cases, the two placentas are adjacent to each other and there are often difficulties in distinguishing between dichorionic-fused and monochronic placenta. The best way to determine chorionicity is by an ultrasound examination at 6–9 weeks of gestation, when in dichorionic twins there is a thick septum between the chorionic sacs. After 9 weeks, this septum becomes progressively thinner to form the chorionic component of the intertwin membrane, but it remains thick and easy to identify at the base of the membrane as a triangular tissue projection, or lambda sign.<sup>1,2,6</sup>

Compared with singleton pregnancies perinatal mortality and morbidity is 3–7 times higher in twin pregnancies.<sup>1</sup> Differences in twin pairs influence their perinatal outcome as well as growth and development. Twin 1 has lower perinatal morbidity rates as compared to twin 2. Compared to first-born twins, studies have shown that twin 2 is more likely to have lower Apgar scores, less favourable umbilical arterial or venous parameters, a higher incidence of intraventricular haemorrhage, respiratory distress syndrome, a higher perinatal mortality, and a higher need for intubation. The disadvantage of twin 2 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 haemorrhage and decreases surfactant production, thus increasing respiratory distress,) chorionicity, and undiagnosed twins.

The most important complication of any pregnancy is a preterm delivery. Almost all babies born before 24 weeks die while majority of those born after 32 weeks survive. Delivery between 24 and 32 weeks is associated with a high chance of neonatal death and handicap in the survivors. In a singleton pregnancy, the chance of preterm delivery between 24 and 32 weeks is 1–2%.<sup>1</sup> The median gestation at delivery of live births is only marginally earlier in monochronic (36 weeks), compared to dichorionic (37 weeks) pregnancies. The proportion of pregnancies delivering preterm (before 32 weeks) was nearly twice as high in monochronic (9.2%) compared to dichorionic (5.5%) twins.<sup>1,2,5,6</sup>

Birthweight differences in twin pairs influence their perinatal outcome as well as growth and development.

Neonatal morbidity is lower in twin 1 as compared to twin 2. Inter-twin disparities in growth are likely to reflect the degree of unequal splitting of the initial single cell mass or the magnitude of imbalance in the bidirectional flow of fetal blood through placental vascular communications between the two circulations. In twin pregnancies, the risk of delivering growth-restricted babies is about 10 times higher than in singleton pregnancies. In view of the high risk of complications, twin pregnancies should be managed in hospital obstetric units by a consultant led team and require additional surveillance as well as the routine antenatal care given to all women. Visits should be four weekly until 28 weeks, twice weekly to 32 weeks, then weekly with increased frequency if complications develop.<sup>1,2,5,6</sup>

## Patients and Methods

This descriptive study was performed at Maternal and Child Health Center, Pakistan Institute of Medical Sciences, Islamabad from 10<sup>th</sup> April 2010 to 10<sup>th</sup> Jan 2011. Sample of 58 twin pregnant women was selected among the women attending the antenatal clinic and emergency according to the inclusion criteria. Ultrasound for the determination of chorionicity (number of placentae i.e. either one or two placentae) of twins was performed by a radiologist or obstetrician. Cases were followed till the time of delivery. At the time of delivery, birth outcomes i.e. gestational age, birth weights and Apgar scores at 1 and 5 minutes were noted on the study performa by attending obstetrician.

Gestational age at the time of delivery was determined by last menstrual period or by ultrasound. Digital scale machine was used for determining birth weights in grams. Apgar scores at 1 and 5 mins after birth were determined by attending neonatologist. There are 5 parameters of Apgar score i.e. A appearance, P pulse rate, G grimace, A activity, R respiratory effort. Each parameter was given a score of 0, 1 or 2.

## Results

The total number of patients, who delivered at MCH Center, PIMS, during the study duration were 3995. Among them, 58 women (1.4%) were diagnosed as having twins. Among the twins 46.55% were monochorionic and 53.44% were dichorionic. The mean maternal age among twins was  $27.08 \pm 4.47$  years with a range of 20 to 40 yrs. Among twins Primigravida were 17 (29.3%), multigravida were 39 (67.2%) and grandmultigravida were 2 (3.4%) (Table 1). The mean gestational age among twins was  $35.62 \pm 2.99$  weeks with a range of 27 to 41 weeks. The mean

gestational age was 34.05± 3.27 with a range of 27 - 39.69 weeks in MC and it was 36.9 ±1.87 with a range of 33-41 weeks DC. The mean birth weight of twins was 2019.31 ± 486.50 with a range of 800 to 3000g. The mean birth weight of twin 1 was 2065.51 ± 486.14 and that of twin 2 was 1973.10±486.67g (Table 2). The mean Apgar score of twins at 1 min was 6.51 ± 1.82 with a range 0.00 to 9.00 and it was at 5mins 7.84± 1.95 with a range 0.00 to 10.00 . The mean Apgar score of twin 1 at 1 & 5 min was 6.68±1.80 & 7.94±2.04 respectively. Whereas the mean Apgar score of twin 2 was 6.34±1.84 at 1min and it was 7.74±1.87 at 5min (Table 3).

**Table 1: Parity among twins**

Parity	Number	Percentage(%)
Primary gravida	17	29.3
Multigravida	39	67.2
Grandmultigravida	2	3.4

**Table 2 : Comparison of mean birth weight between twin 1 and twin 2 in grams**

Twins	Mean	SD
Twin 1	2065.51	486.41
Twin 2	1973.10	486.67

**Table 3: Twin Pregnancies- Mean Apgar score**

	Apgar score at 1 minute (Mean± SD)	Apgar score at 5 minute(Mean± SD)
Twin 1	6.68± 1.80	7.94± 2.04
Twin 2	6.34± 1.84	7.74± 1.87

## Discussion

Twin pregnancy opens fertile field for discussion and study of all obstetric complications that can occur in a single patient .The simultaneous birth of two infants present formidable hazards to the fetuses.

The incidence of twin pregnancies has increased enormously over the last three decades due to increases in ovulation induction, in vitro fertilization (IVF) as well as childbearing at older ages. In the current study the incidence of twins were 1.4%.Rizwan et al conducted a two years study on twins and reported the incidence of twin gestation to be 1.44%<sup>7</sup>.In Turkish study carried out by Sezer et al the incidence of twins gestation was reported to be 1.7%,similar to the overall incidence in Turkey.<sup>8</sup>

Twin gestations are high-risk pregnancies that may be complicated by maternal and neonatal morbidity and high neonatal and infant mortality.The offspring of multiple gestations may carry additional risk for

long-term consequences of perinatal complications, including cerebral palsy and learning disabilities.

The mean maternal age in this study was 27 yrs. Nasser et al reported lower maternal age to be 24yrs whereas it was reported to be slightly higher 31 yrs by Suh et al.<sup>9,10</sup> Further analysis of mean maternal age in present study showed ,a mean of 26yrs among MC and 27 yrs among DC. It was 30yrs for MC and 33yrs for DC respectively which may be due to the use of assisted reproductive techniques. Hatker et al , observed a lower maternal age i.e. 23 and 24 yrs for MC & DC respectively.<sup>11</sup>

Present study revealed total number of monochorionic diamniotic twins to be 27 (46.55% %) dichorionic diamniotic twins were 31(53.44% %).Our study is not a representative of community incidence as it is a referral level hospital . In Hatkar et al study, the number of DC were more than the number of MC twins was 29 (29%), that of dichorionic diamniotic twins was 71(71%).<sup>11</sup>

As reported in the literature the association between twin gestation and multiparity, our study analysis of parity found highest number of twins gestation among multiparous woman, which was contrary to the findings of Onyiriuka et al.<sup>12</sup> In our study , Primigravidae were 17 (29.3%),multigravidae were 39 (67.2%) and grandmultigravida were 2 (3.4%) .Onyiriuka et al reported a higher incidence of twins gestation among primiparous woman. They found that among woman giving birth to twins 50% (67.6%) were primiparous , 8 (10.8%) multiparous and grand multiparous 16 (21.6%).<sup>12</sup>

Neonatal complications are primarily the result of preterm delivery. Problems related to prematurity include perinatal mortality, low birth weight, respiratory and gastrointestinal complications, and long-term neurological impairment. One of the most common finding observed in this study was preterm delivery of the twins.The mean gestational age of twins was 35.62± 2.99 weeks. These findings were similar to certain other studies. Similar observations were found by Rizwan et al i.e., 35.8 weeks and Suh et al, i.e., 36.6± 1.3weeks.<sup>7,10</sup> In contrary, Chauhan et al reported a low mean gestational age of 32.4±4.3 weeks.<sup>13</sup> In a study conducted by Nasser et al<sup>9</sup> it was reported it to be 33.92±3.5. Mostajaren et al revealed it to be 34.1± 3.5wks.<sup>14</sup>

Perinatal mortality is strongly related to low birth weight .Twin gestation is an important cause of LBW . Even in developed countries the documented incidence of LBW twin infants is as high as 50 to 60 percent, a figure that is five to seven times higher than

the incidence of LBW in singletons. Current study showed , mean birth weight of twins to be  $2019.310 \pm 486.50$  which may be due to the preterm delivery. In study conducted by Mostarjeran et al it was  $2240 \pm 678$ g, which was similar for both reduced and non reduced twins.<sup>14</sup> Nasserri et al revealed a low birth weight of  $1619.99 \pm 592.13$ g.<sup>9</sup> The main reason of low birth weight in both the studies was prematurity as observed in our study. Further analysis revealed, a mean birth weight of  $2065.517 \pm 486.14$  for twin 1 and  $1973.103 \pm 486.67$ g for twin 2. Birth weight of twin 1 was more than twin 2. Similar results were quoted for a higher mean birth weight of twin 1 as compared to twin 2 by Sezer et al i.e.  $2065-2327$ g and  $1887-2262$ g respectively . These findings were observed to be lower than what is indicated in the literature. The mean birth weight for twin 1 and twin 2 was found to be more than our study by Swenede et al with a conclusion of twin 1 being heavier than twin 2.<sup>15</sup> It was  $2460 \pm 436$  for twin 1 and  $2390 \pm 451$ g for twin 2. Study conducted by Suh et al ,revealed the mean birthweight of  $2527 \pm 354$  for twin 1 and  $2550 \pm 406$  for twin 2.<sup>10</sup> Chauhan et al reported a lower mean birth weight for both twins than our study ,i.e.  $1851 \pm 676$ g for twin 1 &  $1883 \pm 655$ g for twin 2.<sup>13</sup>

The current study revealed , the mean Apgar score of twins at 1min to be  $6.517 \pm 1.824$  and a 5min score of  $7.844 \pm 1.958$ . Nasserri et al reported a higher incidence of mean apgar score at one and five minutes. It was  $7.83 \pm 1.76$  at 1 min and  $9.12 \pm 1.48$  at 5min. In current study, twin 1 have a mean apgar score at 1 min of 6.68 and twin 2 have a score of 6.34. At 5mins twin 1 has an apgar score of 7.9 and twin 2 achieve a score of 7.74. The reason can be low birth weight and prematurity. But the weakness of our study was the lack of data on analysis of cord blood gases. According to Suh et al , compared to first-born twins, studies have shown that twin B is more likely to have lower Apgar scores. Ziadeh et al compared the mean Apgar scores of twin 1 and 2.<sup>16</sup> They found lower Apgar scores of both twins at 1 and 5 minutes which may be due to prematurity and low birth weight. The Apgar score of twin 2 was significantly lower than twin 1. Twin 1 had Apgar score of 5.2 at min, while twin 2 had an Apgar score of 4.6. At 5mins the scores were 7.2 and 6.8 for twin and twin 2 respectively. Historically, second twins have had a significantly worse outcome than first twins, however, most of the studies showing an increased adverse outcome in the second twin were done at a time when

the second twin was not monitored and often not diagnosed until after the delivery of the first twin

## Conclusion

1. Twin gestations are at significant increased risk for adverse perinatal outcome, requiring increased fetal surveillance.
2. Prematurity and low birth weight are the common complications of twins associated with low apgar score.
3. The mean gestational age ,birth weights and apgar scores of twin 1 are more than twin 2
4. The mean gestational age ,mean birth weight and apgar score of monochorionic twins are lower than dichorionic twins.

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