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RESEARCH ARTICLE

Maternal Risk Factors and Neonatal Complications of Twins

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Abstract

Background:- Twin pregnancy is high risk pregnancy and lead to maternal and neonatal morbidity and mortality so need special care to avoid these complications if it is possible.

Aim of study:- To study the maternal risk factors of twin pregnancy, to study the neonatal complications and its occurrence in 1st or 2nd born neonates and to study the relationship between these complications and mode of delivery.

Patients and methods:-

This is cross sectional study done in Al-Kadhymia teaching hospital in neonatal care unit, pediatric ward and maternity department in the period between 1st February to 1st September 2010 included 50 pairs of twins, the mothers of these twins were submitted for detailed maternal history and each neonate was submitted for thorough physical examination, laboratory investigations and follow up.

Results:- From total 50 pregnant women, 21 women were in age between (31-35year), 39 women in weight group between (65-75kg), 36 women in height group between (160-170cm), 37 women from urban area, 26 women without any family history of twins, 42 women without any history of using of any methods of induction of ovulation. From a total 100 neonates, males were 61(61%) and female were 39(39%), thirty three (66%) were delivered by CS and seventeenth (34%) were by NVD, thirty six (72%) were preterm (gestational age less than 37week) and the remaining were term (gestational age equal or more than 37week). The neonatal complications were respiratory distress syndrome 52, neonatal jaundice 43, sepsis23, intra uterine growth restriction 11, congenital anomalies 7, hypoglycemia 7, birth asphyxia 5, birth trauma 4, anemia 3 and polycythemia 1. The neonatal complications of 1st and 2^{nd} twins were respectively as following respiratory distress syndrome (15,37), jaundice(15,27),sepsis(6,17), IUGR(4,7), congenital anomalies(1,6), hypoglycemia (0,7), birth asphyxia(1,4), birth trauma(1,3), anemia(2,1) and Polycythemia (0,1).

Conclusions:-

Twin pregnancy is high risk pregnancy, directly proportional with maternal age and the family history of twin pregnancy was more related to maternal side than paternal side, second born twin is more liable for complications than first twin, prematurity was a dangerous complication and need special care followed by respiratory distress syndrome and jaundice, these complications occurred more commonly with cesarean section delivered twins.

Introduction

Background:

Multiple gestations now accounts for approximately 3% of all pregnancies in the united states. The incidence of spontaneous twins varies by country.(1,2) . The incidence of multiple gestations is probably underestimated.

Fewer than half of twin pregnancies diagnosed by ultrasonography during first trimester are finally delivered as twin**,** a phenomenon that has been termed *vanishing twin.* The incidence of monozygotic twinning is remarkably constant at 3-5 per 1000 pregnancies, whereas the rate for dizygotic twinning varies from 4-50 per 1000 pregnancies. The rate of monozygotic twinning is considered a chance phenomenon, whereas dizygotic twinning results from multiple ovulations, shows wide ethnic variability, and may have a maternally familial tendency. Other factors that influence the incidence of dizygotic twinning include race, nutrition, parity, advanced maternal age, coital frequency, and seasonality. **(3)**

The incidence of multiple gestations in the United States has increased dramatically during the past three decades as a result of the shift in maternal age distribution to older ages, as well as the increased use of fertility enhancement therapy**.(2)** Taller, heavier women bear twins at a rate 25% to 30% higher than short, undernourished women. Parity is an independent risk factor, with multiparous women having a greater likelihood for multiple gestations. Advanced maternal age predisposes to dizygotic twinning, with peak incidence at 37 years of age. Coital frequency has a positive effect, with a high rate of twin conceptions within the first 3 months of marriage Another factor is the effect of the climatic seasons**,** most dizygotic births are autumnal.(4,5).

Perinatal Complications:-

The frequency of single fetal demise in multiple gestations is reported as 0.5% to 6.8%, Multiple gestations account for 10% to 12% of perinatal deaths. (6)

Increased frequencies of prematurity, pre-eclampsia, hydramnios, placenta previa, abruption placenta, and cord prolapsed contribute to increased mortality. (1)

Twin to Twin Transfusion:-

Interfetal blood exchange occurs almost exclusively in monochorionic twins**.** (7).

Asphyxia:-

The second-born twin has potentially greater risk for hypoxia and trauma, regardless of the route of delivery.(8)

Growth: Birth weights of live-born twins up to 30 weeks of gestation are slightly smaller but similar to singletons of the same gestational age, After 30 weeks, twin fetuses have a more linear rate of growth ,Better growth in the third trimester for multiple gestations reflects the positive impact of more aggressive maternal nutritional and obstetric care management(9). Multiple gestations account for 17% of intrauterine growth retardation, with higher mortality rates for affected infants.(10)

Congenital Anomalies:-

Monozygotic twins have an increased frequency of congenital anomalies compared with dizygotic twins or singletons.(11)

Prematurity:-

The preterm birth rate of twins increased . This increase was related to more aggressive prenatal surveillance, an increase in labor induction, and an increase in first cesarean delivery(12).

Hyaline Membrane Disease (13):-

Twins are at increased risk of developing hyaline membrane disease due to the increase in preterm delivery.

Necrotizing Enterocolitis (12):-

Unique risk factors for the development of necrotizing enterocolitis have not been identified for twins or higher multiple gestations.

Infection:-

One early study reported an increased rate of early-onset group B streptococcal disease in LBW twins compared to LBW singletons (14). Other studies failed to show an increased risk of early-onset group B streptococcal disease in multiple gestations independent of prematurity (15, 16).

Sudden Infant Death Syndrome (17):-

Monozygotic and dizygotic twins are at some increased risk of sudden infant death syndrome (SIDS) compared with singletons, and this is especially true for LBW pairs**.**

Aims of study

1. To study the maternal risk factors of twin pregnancy.
2. To study the neonatal complications of twin pregnancy and its relation to 1st and 2nd born twin.
3. To study the relationship between neonatal complications and mode of delivery.

Patients and Method

This is a cross sectional study done in Al-Kadhymia Teaching Hospital in neonatal care unit and maternity department in period between 1st February to 1st September 2010 included 50 pregnant women and their twins.

The data were collected by a questionnaire to the mothers and direct examinations of the twin neonates, The maternal aspect included age, weight, height, residency, educational state of mothers, family history of twin pregnancy, induction of ovulation and type of delivery.

The neonatal aspect included gestational age, sex , the presence of neonatal complications such RDS, IUGR, anemia, polycythemia, jaundice, hypoglycemia, ICH, congenital anomalies, birth trauma, birth asphyxia and sepsis.

Investigations done as CBP, TSB, RBS, CXR, blood culture and sensitivity when needed.

The data are collected, organized, tabulated and figured by using computer software SPSS version 17. The results were expressed in form of numbers, percentages and Chi-square (2-sided) which was statistically significant at level less than 0.05.

Results

Maternal age:- divided into groups, it was higher in 3rd group (31-35 years)(42%) 21mothers and lesser in the 5th group (more than 40 years) (2%) 1 mother, as shown in table(1) .

Maternal weight:- divided into groups each 10 kg in one group, it was higher in (65-75kg) (78%) 39 mothers followed by (76-85kg) 8 female and finally (86-95kg) 3 female as shown in table(2).

Maternal height: - two groups, (160-170 cm) and (171-180 cm) (72%, 28%) 36, 14 mothers respectively as shown in table (3).

Maternal residency: - it was more common in urban area (74%), rural area (26%) as shown in figure (2).

Maternal education: - it was found more in secondary school education mother (54%) (27 mothers), then followed by primary education (30 %) (15 mothers) and finally collage level (16 %) (8 female) as shown in figure (3). Maternal family history of twin: - it was found that female with no family history of twins was higher group (52 %) (26 mothers) then followed by maternal side history (38 %) (19 mothers, then from paternal side (6%) (3 mothers) and finally herself (4 %) (2 female) as shown in figure (4). Maternal use of methods of induction of ovulation: - it was found that spontaneous (no induction) was higher 42 (84%), 6 (12%) with history of IVF, 2(4 %) with history of induction by medication as shown in figure (5).

Mode of delivery: - as shown in figure (6), (66%) delivered by CS and (34%) delivered by NVD. Gestational age of twin:- most of cases were premature, (35-36 wks) 20 twins (40%), then (33-34wks) 11 twins (22%), followed by (31-32 wks) 5 twins (10%), others were full term 14 twins(28%) as shown in table(4) . Sex distribution of twins:- as shown in figures(8,9) in the first born the male (50%) and female (50%), in the second born were (72%) male, (28%) female. Complications of twin:- table (5) show the relationship between complications and first, second baby as follow RDS (15, 37), jaundice(15,27),sepsis(6,17), IUGR(4,7), congenital anomalies(1,6), hypoglycemia (0,7), birth asphyxia(1,4), birth trauma(1,3), anemia(2,1), Polycythemia (0,1) respectively. Table (6) show the relationship between complications and mode of delivery(NVD,CS) as follow: RDS(12,40), jaundice(12,30), sepsis(8,15), IUGR(7,4), hypoglycemia(3,4), congenital anomalies(2,5), birth asphyxia(5,0), birth trauma(3,1), anemia(0,3), Polycythemia (0,1) respectively.

Table (2):- The distribution of sample according to maternal body weight.

Maternal Weight Group	Number	Percentage
Group 1 (65 kg-75 kg)	39	78%
Group 2 (76 kg-85 kg)	8	16%
Group 3 (86 kg-95 kg)	3	6%
Total	50	100%

Table (3):- The distribution of sample according to maternal height.

Maternal Height Group	Number	Percentage
Group 1 (160 cm-170 cm)	36	72%
Group 2 (171 cm-180 cm)	14	28%
Total	50	100%

Table (1):- The distribution of maternal sample according age group.

Maternal Age Group	Number	Percentage
Group 1 (21 years-< 25 years)	9	18%
Group 2 (25 years-< 30 years)	17	34%
Group 3 (30 years-< 35 years)	21	42%
Group 4 (35 years-< 40 years)	2	4%
Group 5 (≥ 40 years)	1	2%
Total	50	100%

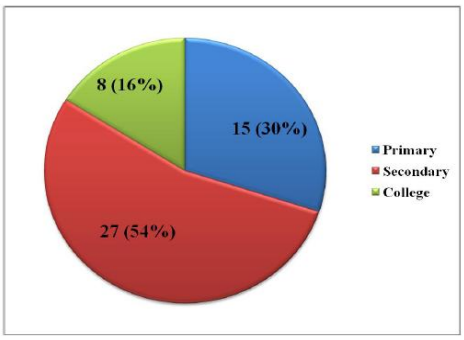

Figure (3):- The distribution of sample according to maternal education.

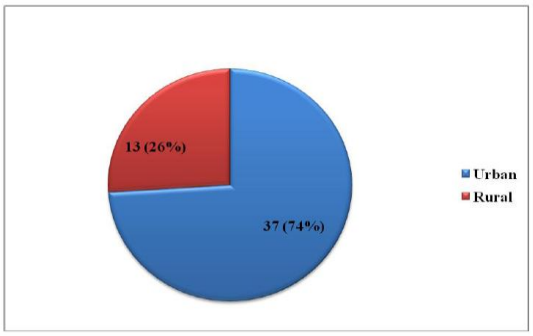

Figure (2):- the distribution of sample according to maternal residency.

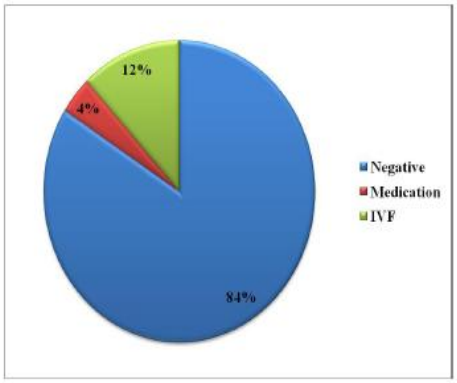

Figure (5):- The distribution of twins according to induction of ovulation.

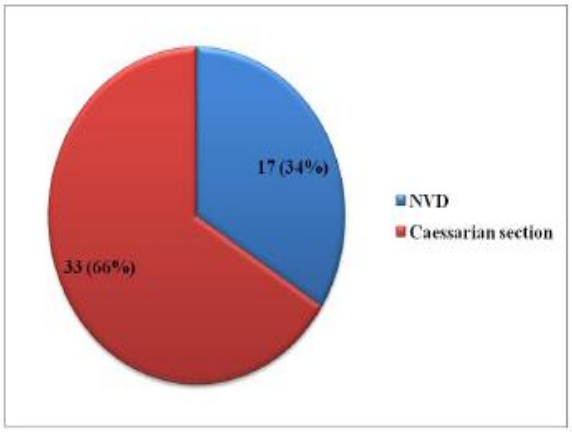

Figure (6):- The distribution of twins according to type of delivery.

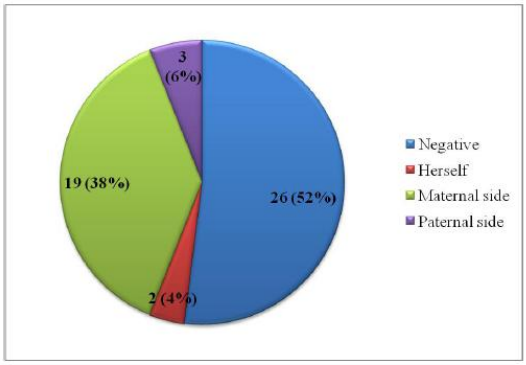

Figure (4):- The distribution of sample according to family history of twin.

Table (4):- The distribution of twins sample according to gestational age.

Neonatal Age Group	Number	Percentage
Group 1 (31 weeks-32 weeks)	5	10%
Group 2 (33 weeks-34 weeks)	11	22%
Group 3 (35 weeks-36 weeks)	20	40%
Group 4 (> 37 weeks)	14	28%
Total	50	100%

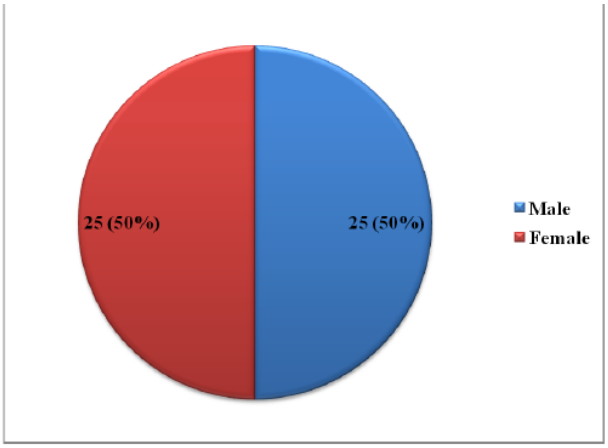

Figure (8):- The distribution of first baby according to sex.

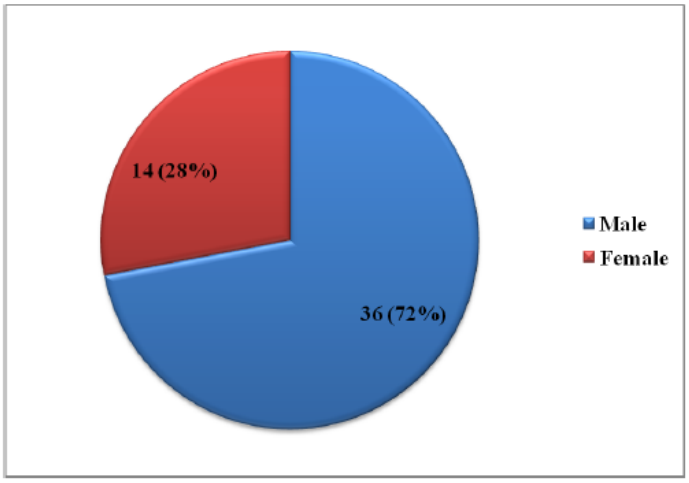

Figure (9):- The distribution of second twin according to sex.

Table (5):- The complications of total sample of twins.

Complication	First baby			Second baby		
	No.	%	P.value	No.	%	P.value
RDS	15	30%	**0.003***	37	74%	**0.045**
Jaundice	15	30%	**0.003**	27	54%	**0.001**
Sepsis	6	12%	0.188**	17	34%	0.246
IUGR	4	8%	0.639	7	14%	0.169
Congenital anomalies	1	2%	0.509	6	12%	0.965
Hypoglycemia	-	-	-	7	14	0.356
Birth asphyxia	1	2%	0.894	4	8%	0.429
Birth trauma	1	2%	0.509	3	6%	0.685
Anemia	2	4%	0.490	1	2%	0.509
Polycythemia	-	-	-	1	2%	0.894
IVH	-	-	-	-	-	-

*P.value $<$ 0.05 (significant).

**P.value $>$ 0.05 (not significant).

Discussion maternal risk factors that affect the twin pregnancies (multiple births); one of these factors is age. in our study we found more pregnant mother were between 31-35 year (42%), this does not agree with results comes from Jeddah (18) with age of (25-30) years represent the bulk group of pregnant female, the small sample size may play a role in this results but it agreed the thesis that say the twinning rate directly proportional with maternal age (5). Regarding to residency, Data from France, show regional variations ranging from 8.1 per 1000 in the south-west to 11.8 per 1000 in Alsace/Lorraine in the north. In Italy, not only was there a decrease from north to south, but also higher frequency of twins was noted in the east than the west, the twinning rate in the Irish Republic is higher than that in the United Kingdom, it was 13.6 per1000 vs. 10.8 per 1000 in Northern Ireland and 10.0per 1000 in England and Wales, respectively. (5). According to residency of women, twins were more in urban (74%) and rural (26%), so

we cannot clarified the effect of geographical variation due to limited area that samples were taken from (limited to area around our hospital). Regarding family history also play an important role, we found (52%) without any history of multiple, other groups are (4%) with history of multiple birth, (38%) from maternal side, (6%) from paternal side. Weinberg (5) discovered that, the twinning frequency was increased by almost (54%) among mothers of twins and the sisters and daughters of the mothers, but was not elevated or was even lower among the relatives of fathers of twins; he concluded that the inheritance of DZ twinning is restricted to the female line. A similar study was conducted in the Orkla valley in Norway (5); our results are compatible with thesis of Weinberg. Socio economic state and maternal education play a role that the pregnant female had a regular prenatal care or not, maternal height and weight which reflect nutritional state of the mothers. In study from USA, Luke (19) reflect the prenatal nutrition and education programs affect on improving pregnancy and neonatal outcomes, our data did not give significant result in these factors due to more people in our country are low socio economic state, limited area that samples were taken from it and small number of samples, all these effect on maternal education level (16%) was reach collage. Induction of ovulation is another risk factor, in Denmark (20), 4% of all infants are born after IVF or ICSI and 40% are twins, there is 10 fold increase risk of delivery before 37weeks and the risk of CS and admissions to NCU was higher in twins than singletons, many methods used for induction of ovulation such as tablet, injection or (in vitro fertilization). In our study data revealed that (84%) without any history of induction, (4%) took medications (tablet), and IVF in (12%) of cases. Regarding to neonatal complications of twins pregnancies and their relationships with first and second twins, we found the prematurity was the major complication ,the preterm labor occurred in (72%) of our cases, this ratio was more than ratio reported in Bangkok(21), (49.2%) and Texas(22) (64.3%), this high ratio also occurred in Jeddah(18), the causes of this high ratio might be related to medical history of pregnant women and complications of pregnancy, further study of other causes of preterm labor and appropriate preventive procedures are necessary to reduce the incidence of prematurity and finally to reduce the twin mortality and morbidity, data comes from Florida(23) reveal that 37 to 38 weeks was optimal time for delivery to reduce maternal and neonatal morbidity associated with twin pregnancies. Other complication was RDS which occurred in (30%) in first born baby and (74%) in second born baby with p-value (0.003, 0.045) respectively, the primary mechanism for this increased risk of RDS is prematurity, RDS occurred more common in second twin born in other study, Shinwell(24) says the second born twins seem to be at risk for increased respiratory morbidity even with routine antenatal corticosteroid and postnatal surfactant therapy. Other study from Bangkok (21), reported that RDS is more common in second twin. The better antenatal care, early diagnosis of preterm labor and prevent it if possible and steroid administration for management of preterm labor might decrease the respiratory morbidities in twin babies. The other complications in our study which occurred in significant ratio was neonatal jaundice (30%) in first baby and (54%) in the second baby with p-value (0.001, 0.001) respectively, the explanation of this high ratio might to be related to prematurity, the twin pregnancies born moderately and late preterm encounter higher rate of neonatal morbidities compared with twins born at term (22). Other complications that occurred in this study are sepsis, IUGR, congenital anomaly, hypoglycemia, birth asphyxia, birth trauma, anemia, and polycythemia. In this study these complications occurred more common in second born twin but statistically not significant due to small size of sample, data reported from Bangkok was similar to our results in some complication such sepsis which occurred in ratio (12%) in first twin and(34%) in second twin, reasons related to maternal history. In general, in this study the neonatal complications of twin pregnancy were more common in second born twin, our results was similar to data reported from Crowther (25) who found a significant rise in mortality and morbidity in second twin . Fakeye (26) also reported the mortality and morbidity in second twins. On the other hand, Nakano (27), found no particular differences of neonatal mortality and morbidity in first and second twins. Other data from study done in Jeddah (18) found no differences in complications among first and second twins. The small amount of information about intrauterine variables such as chorionicity, placental insufficiency, obstetrical maneuvers and prolonged labor also play important roles in the presence of complications. Regarding to complications and their association with type of delivery, we found CS was occurred as mode of delivery in 66% and NVD in 34%, our results agreed with results of Bangkok (21) (58.3%) as CS was type of delivery, and other study done in Abha, Saudi Arabia (28) (61%), while study of Jeddah considered NVD was common type of delivery. The obstetrical history play major role in this ratio, other cause may be maternal request especially in twin pregnancies induced by IVF to avoid any neonatal complications. Our results reveal the neonatal complications was occurred more common with CS as a type of delivery, significant p-value in RDS and jaundice (0.043, 0.022) respectively. Other complications also occurred more common with CS but statistically not significant, there was an exception for birth trauma and birth asphyxia which happened with NVD more than CS, the explanation of this result might be related to obstetrical maneuver and prolongation of labor time. Shinwell (29), in other study shows that twins tend to receive earlier prenatal care, receive more antenatal steroids, are more often delivered by CS and more often suffer from neonatal complications

especially respiratory morbidities. In the other hand, Osbourne (30) concluded high reduction of neonatal complications in Dundee was related to the effect of increased rate of CS.

Conclusions

1. Most of pregnant mother with twin pregnancy were between (30-35years) of age.
2. Family history of twin pregnancy was more related to maternal side. 3. Most common complications were prematurity followed by RDS and jaundice. 4. Second born twin is more liable for complications than first born twin. 5. The complications occurred more in CS except birth trauma and birth asphyxia which occurred more commonly with NVD**.**

Recommendations

1. Women of twin pregnancy should have regular antenatal visit, regular ultrasound examination to assess accurate gestational age and to discover avoidable maternal and neonatal complications.
2. Women of twin pregnancy should be exclusively delivered in the hospital by an experienced obstetrical and pediatrician teams.
3. We recommended the availability of surfactant and other respiratory supports to reduce the morbidity and mortality of neonates from prematurity and RDS.

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