

Relationship between Fetal Gender, Pregnancy and Neonatal outcome among Pregnant Women attending labour ward at Al- Batool Teaching Hospital for Maternity and Children in Diyala Governorate. Iraq

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Abstract

Background: In many societies, adverse outcomes in pregnancy and labour have often be ascribed to male fetal gender, so, In recent years, many investigators try to find any relationship between fetal gender and pregnancy outcome.

Objective: To evaluate the role of fetal gender on pregnancy and neonatal outcome.

Subjects and methods: A cross sectional study was done at a labour ward in Al-Batool Teaching hospital for maternity and children in Diyala Governorate, Iraq during the period from 1st of August till 31st of October 2013. One hundred one pregnant women were eligible for enrollment in the study according to inclusion criteria. The effect of fetal gender on both maternal and fetal parameters were all recorded.

Results: A total of 101 neonate were born, of whom 53 were males and 48 were females, there was no significant differences noticed between male and female regarding to the maternal age and parity. Also the result showed that preterm and post term pregnancies more frequently in male bearing pregnancies than in female bearing pregnancies (4.95%, 0.99% respectively), despite these findings were significant statistically, while fetal gender has no positive correlation to the weeks of gestation. Pregnant women with a male fetus had a higher rate of cesarean section (8.91%) than with female fetuses (4.95%) which is statistically significant but there is no positive correlation between fetal gender and cesarean section, the results of this study find that there is no correlation between neonate gender and birth weight. By studying the correlation between neonate gender and other neonatal parameters like Apgar score <7 at 5 mint, admission to NICU, clear liquor, and Meconium liquor it was proved that there is no correlation between fetal gender and these parameters except there is a positive correlation between male gender and Apgar score <7 at 1 mint.

Conclusions: There is a positive correlation between male gender and Apgar score <7 at 1 minute but no correlation found between fetal gender and other maternal or neonatal parameters.

Key words: Fetal gender, pregnancy outcome, neonatal outcome.

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Introduction

Hall and Carr-Hill first described the relationship between fetal gender and pregnancy outcomes (of labor dystocia, cord problems and fetal distress, low Apgar scores and perinatal mortality) 30 years ago [1], several studies investigating this phenomenon in different parts of the world have been published, most work was carried out in western countries [2,3]. Researchers described preterm delivery to be higher in the male fetuses, which was due to increased incidence of spontaneous preterm labor and preterm premature rupture of the membranes [4]. Also number of studies have been extensively investigate fetal gender differences in the first trimester. It has been suggested that fetal sex influences first-trimester maternal serum marker concentrations, with male fetuses associated with a higher chance of abnormal serum marker concentrations [5].

There is no single explanation for such differences. Nevertheless, few theories exist: An increased metabolic rate might cause an increased vulnerability of male infants during critical stages of development [3], or may be the significant association found between male gender and cord problems could be partially explained by longer cords among males, this could result in higher rates of prolepses, true knots of cord and nuchal cords, also abnormal FHR patterns and specifically variable decelerations may also be more common when there are cord entanglements [1,3]. Other theory indicate that males are heavier than the females as was demonstrated by higher birth-weight, and higher percentage of fetal macrosomia (birth weight above 4 kg), [3, 4, 6].

Another theory explain that, male fetuses are more likely to have a positive placental membrane cultures than female infants and a decidual lymphoplasmacytic cells infiltrations where more common in male

versus female placentas, suggesting that a maternal immune reaction to fetal tissue may be more common in male fetuses [6], also the maternal immune response to the HY protein, encoded by the Y chromosome of the male fetus, enhances maternal immune activation over that achieved by a female fetus. These observations support the assumption that degrees of immune modulation may play a more important role in pregnancies with male fetal sex than in those with female fetal sex [7]. On the other hand some theories found that males institute strategies that allow them to continue to grow normally in an adverse intrauterine environment which then places them at risk of compromise in the presence of a second stressful event such as an acute asthma exacerbation, females adapt to a poor intrauterine environment of chronic maternal asthma by reducing their growth so they are smaller but not IUGR, this allows them to survive any further compromises in the intrauterine environment to nutrition or oxygen supply as the pregnancy progresses [8,9], finally, the presence of a male fetus was associated with a more vasoconstrictor state in the maternal micro vascular circulation of pre-eclamptic women. In women pregnant with a female fetus, maternal micro vascular function was not significantly different between normotensive and hypertensive women [9].

The present study design to investigate whether fetal gender may had any influence on pregnancy and neonatal outcome in our population, we study the association between fetal gender and pregnancy

Materials and Methods

A cross sectional study was done at a labour ward in Al-Batool Teaching Hospital for Maternity and Children in Diyala Governorate, Iraq during the period from 1st of August till 31st of October 2013. There were 1500 deliveries at Al- Batool Teaching

hospital during the studied period 1215 were normal vaginal deliveries while 285 were caesarean deliveries.

One hundred one pregnant women were eligible for enrollment in the study. Inclusion criteria were healthy pregnant women with singleton pregnancies that completed 28 weeks of gestation to completed 42 weeks of gestation (by last menstrual period or early scan) presented with diagnosis of labor or delivery and admitted to the labor ward. Women who did not know their last menstrual period or do not have early ultrasound scan for calculation of weeks of gestation, pregnant with medical disease before or during pregnancy, those who pregnant with stillbirths, neonatal deaths, and infants with congenital anomalies were excluded.

Points studied included the effect of fetal gender on the maternal age, gestational age, parity, mode of delivery, indications for caesarean section, presence of meconium stained liquor, and neonatal characteristics such as neonatal weight, Apgar score at 1 and 5 minute, and NICU admission were all recorded. Failure to progress as a cause of caesarean section was defined as the lack of progressive cervical dilatation or lack of descent of fetal vertex (8). Fetal distress as a cause of caesarean section was performed in presence of the followings (1) pathological CTG trace, defined according to Royal College of Obstetricians and Gynecologists guidelines (2) meconium-stained amniotic

fluid [8, 10].

Statistical analysis

Was performed using SPSS for windows TM version 17.0 and Microsoft Excel for windows 2010. Data analysis was performed using, Qualitative variables of parameters were expressed as number and percent, T-test was used to find out the significance of differences between two groups that composed from continuous variables, ANOVA test was used to find out the significant differences of more than two groups of continuous variables, Pearson test for correlation was used for non-categorical data. The level of significance was 0.05(two-tail) in all statistical testing; significant of correlations include also 0.01 (two-tail) .The level of confidence limits was 0.095.

Results

A total of 101 neonate were born, of whom 53 were males and 48 were females, splitting the group of women on the basis of parity, although higher number of males 19 (18.81%) were born among nulliparous women which is higher than females 17(16.83%) and also in multiparous women 19(18.81%), 18(17.82%) males were born more than females respectively and they were higher percentage than of male delivery than among primiparous and grand multiparous but it statistically not significant as showed in Fig.1.

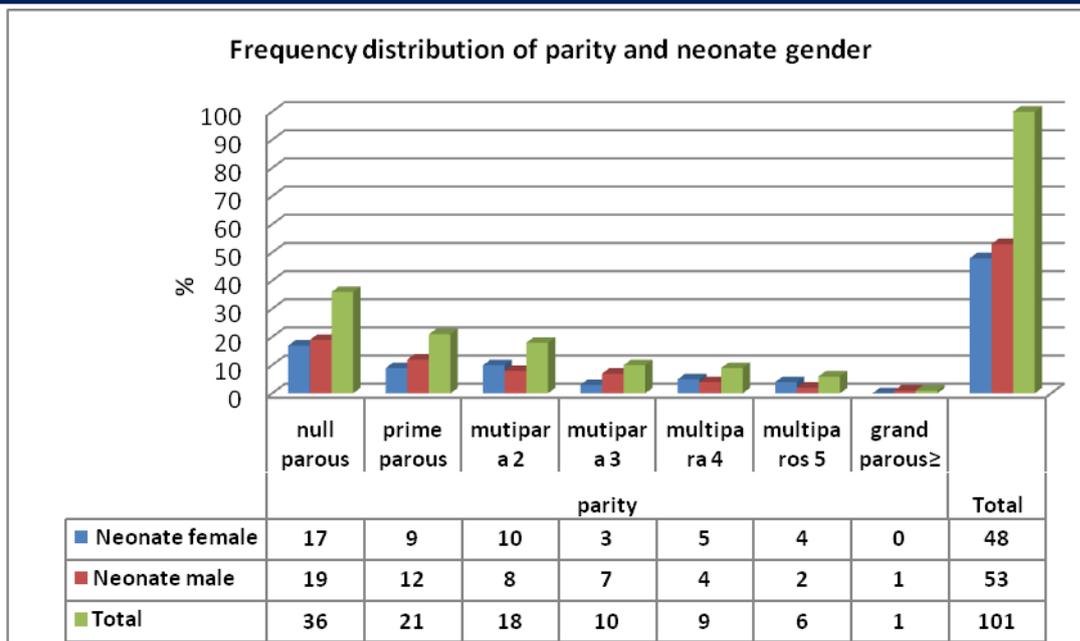


Figure (1): distribution of parity and neonate gender.

As shown in (Fig. 2) younger maternal age (18-22), (23-27) and (28- 32) had higher chance to have male neonate than females

more than older maternal age but it is statistically not significant.

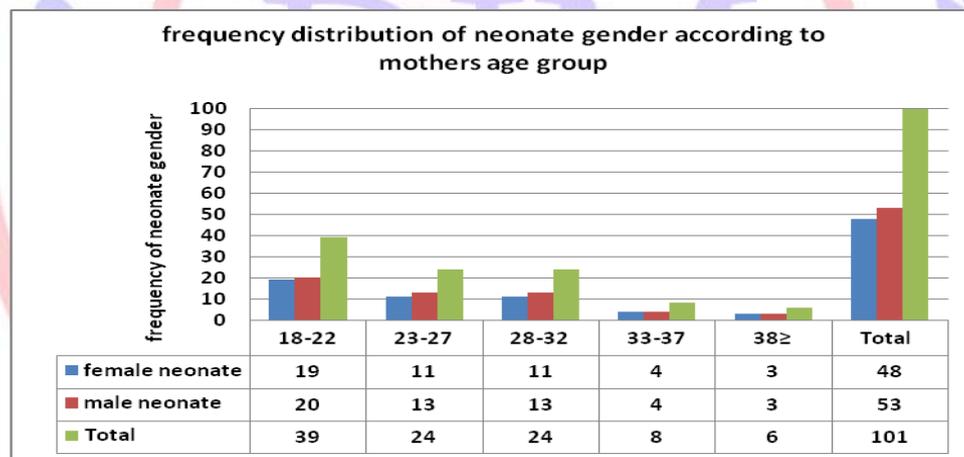


Figure (2): Distribution of neonate gender according to mother's age group.

The percentage of pregnancies that delivered before term (28-36.6 weeks) was significantly higher for male relative to female fetuses (4.95% vs 0.99% respectively), also the same percentage of male to female was with pregnancies that delivered beyond term for both preterm and

post term pregnancies. While There was no statistically significant difference between the number of males and females in term pregnancies (37- 40.6 weeks), but at weeks (41- 41.6 weeks), the number of male and female births was practically identical as showed in table 1.

Table (1): Description of gestation weeks according to neonate gender.

Gestation Weeks	Neonate gender		Total	P-value
	Male	Female		
28-36.6 weeks	5(4.95%)	1(0.99%)	6(5.94%)	0.01613
37-40.6 weeks	36(35.64%)	39(38.61%)	75(74.26%)	0.083155
41-41.6 weeks	7(6.93%)	7(6.93%)	14(13.86%)	ND
≥42 weeks	5(4.95%)	1(0.99%)	6(5.94%)	0.01613
Total	53(52.47%)	48(47.52%)	101(100%)	

Table 2 shows males (8.91%) neonate had a higher incidence of cesarean delivery than females(4.95%) statistically significant, recurrence of cesarean section was higher

among pregnant women with male gender than female gender (6.93%, 1.98% respectively) which is statistically significant.

Table (2): Description of mode of delivery and indication of cesarean section according to neonate gender.

Mothers parameters		Neonate gender		Total	P-value
		Male	Female		
Mode of delivery	NVD	44(43.56%)	43(42.57%)	87(86.14%)	0.322905
	C/S*	9(8.91%)	5(4.95%)	14(13.86%)	0.035265
Indication of Cesarean section	Previous 2 C/S*	7(6.93%)	2(1.98%)	9(8.91%)	0.000736
	Failure to progress	2(1.98%)	3(2.97%)	5(4.95%)	0.42265
Total		53(52.48%)	48(47.52%)	101(100%)	

NVD*: normal vaginal delivery

C/S*: cesarean section

According to the neonatal birth weight the present study showed that males of (3200-3700 gm) was more frequent than females, 20 (19.80%), 14 (13.86%)

respectively. while there were no significant difference noticed among other neonatal birth weight as illustrated in (table 3).

Table (3): Description of neonatal birth weight according to neonate gender.

Birth weight (gm)	Neonate gender		Total	P-value
	Male	Female		
2000-2500	5(4.95%)	4(3.96%)	9(8.91%)	0.373901
2600-3100	17(16.83%)	20(19.80%)	37(36.63%)	0.343436
3200-3700	20(19.80%)	14(13.86%)	34(33.66%)	0.010163
3800-4300	9(8.91%)	10(9.90%)	19(18.81%)	0.343436
4400>	2(1.98%)	0(0%)	2(1.98%)	ND
Total	53(52.48%)	48(47.52%)	101(100%)	

As shown in (table 4) that Parity has significant positive correlation with mothers age. While significant negative correlation was found between mothers age and weeks of gestation. Regarding weeks of gestation has significant positive correlation with neonatal Birth weight and Meconium liquor. While weeks of gestation has significant

negative correlation with Clear liquor. Normal vaginal delivery has significant positive correlation with Birth Weight. Previous 2CS has significant negative correlation with birth weight. Statistical analysis failed to find significant correlation between mother parameters and neonate gender.

Table (4): Correlations among mothers and neonates parameters.

Mothers parameters		age	Weeks of gestation	NVD	Previous 2 Cesarean sections	Failure to progress	Birth weight	Apgar score at 1min	Apgar Score at 5min	Admission to NICU**	Clear liquor	Meconium liquor	Neonate gender
parity	Pearson Correlation	0.694**	-0.172	0.072	-0.004	-0.110	.113	-0.009	-0.013	0.011	0.170	-0.170	-0.030
	P value	0.000	0.085	0.476	0.971	0.275	0.262	0.930	0.901	0.916	0.091	0.091	0.766
Mothers age	Pearson Correlation		-0.251*	0.024	0.052	-0.106	0.096	0.036	0.014	0.053	0.122	-0.122	-0.025
	P value		0.011	0.815	0.604	0.291	0.338	0.723	0.886	0.602	0.226	0.226	0.807
Weeks of gestation	Pearson Correlation			0.149	-0.126	-0.072	0.292**	-0.055	-0.098	-0.084	-	0.286**	-0.098
	P value			0.137	0.210	0.474	0.003	0.586	0.331	0.406	0.004	0.004	0.330
NVD*	Pearson Correlation				-0.780**	-0.569**	0.224*	-0.062	-0.049	-0.038	0.155	-0.155	-0.095
	P value				0.000	0.000	0.024	0.537	0.625	0.707	0.123	0.123	0.345
Previous 2 Cesarean sections	Pearson Correlation					-0.071	-	0.109	0.138	0.127	-0.053	0.053	0.158
	P value					0.478	0.304**	0.279	0.169	0.206	0.603	0.603	0.113
Failure to progress	Pearson Correlation						0.043	-0.044	-0.103	-0.106	-0.178	0.178	-0.057
	P value						0.670	0.663	0.307	0.290	0.077	0.077	0.571

NVD*: normal vaginal delivery

Birth weight has significant negative correlation with each of the following: Apgar

NICU:** neonatal intensive care unite

score at 1min, Apgar score at 5min, admission to NICU, and meconium liquor. Apgar score

at1min has significant positive correlation with Apgar Score at 5min, Meconium liquor and Admission to NICU, Apgar Score at 1

min has a positive correlation with neonate gender table 5.

Table (5): Correlations among neonate’s parameters.

Neonates parameters		Apgar score at1min	Apgar Score at 5min	Admission to NICU	Clear liquor	Meconium liquor	Neonate gender
Birth weight	Pearson Correlation	-0.313**	-0.269**	-0.256**	0.231*	-0.231*	0.058
	P value	0.001	0.007	0.010	0.021	0.021	0.565
Apgar score < 7 at 1min	Pearson Correlation		0.709**	0.677**	-0.375**	0.375**	0.210*
	P value		0.000	0.000	0.000	0.000	0.035
Apgar score <7 at 5min	Pearson Correlation			0.966**	-0.217*	0.217*	0.163
	P value			0.000	0.030	0.030	0.103
Admission to NICU	Pearson Correlation				-0.197*	0.197*	0.184
	P value				0.049	0.049	0.065
Clear liquor	Pearson Correlation					-1.000**	-0.056
	P value					0.000	0.582
Meconium liquor	Pearson Correlation						0.056
	P value						0.582

NICU*: neonatal intensive care unite

Discussion

Several societies, adverse outcomes in pregnancy and labour have often are ascribed to male fetal gender. Such conclusions were previously based largely on observational data and experience rather than on results of rigorous scientific investigations. Several studies conducted in western populations have confirmed that male sex of the fetus carries greater risk for such outcomes as preterm birth, preeclampsia, and intrapartum and neonatal hypoxia [11]. Male gender has also been shown to be associated with a

greater risk for cesarean section delivery [10, 11].

The present that study shows males and females neonates did not significantly differ regarding maternal age and parity. This in agreement with study of Osborn, *et al.*, (2008) who observed that male infants and female infants did not significantly differ in terms of ethnic composition and maternal age[10].

Preterm and post term pregnancies occur more frequently in male bearing pregnancies than in female bearing pregnancies, despite these findings were significant statistically, but fetal gender has no positive correlation to

the weeks of gestation so fetal gender has no effect on shortening or prolongation of weeks of gestation. These findings agree with Maeve, *et al.*, (2003) who conclude there was no statistically significant difference between the fetuses gender and gestation[12], but disagree with Marion, *et al.*, (1982) And Vatten, *et al.*, (2004) who confirmed that in large numbers the sex ratio (male: female) was very high in preterm births but considerably lower at and after term [13,14]. Also disagree with Divon, *et al.*, (2002) and Kitlinski, *et al.*, (2003) who found a strong positive association between male gender and a gestational age of > 41 weeks according to ultrasounds fetometry [15, 16].

Regarding mode of deliveries the present study observed that pregnant women with a male fetus had a higher rate of cesarean section than with female fetuses which is statistically significant and also as an indications of cesarean section recurrence of cesarean section was highly significant in a male bearing pregnancy than female bearing pregnancy while failure to progress was higher in female bearing pregnancies than male which is statistically not significant, analyzing these data using Pearson Correlation found there is no positive correlation between fetal gender and cesarean section and negative correlation with failure to progress. These results disagree with Aibar, *et al.*, (2012) who indicated that mothers of male fetuses had higher rates of cesarean deliveries [17]. And also disagree with Renzo, *et al.*, (2007) and Sheiner, *et al.*, (2004) who approved that patients carrying male fetuses had higher rate of failure to progress during first and second stage of labour[18,19].

The results of these studies show that female neonates had birth weight slightly more than male neonates but it statistically not significant and there is no correlation between neonate gender and birth weight. These results not supported by studies done

by Eyal, (2007) and Osborn, *et al.*, (2008) who concluded that babies of patients carrying male fetuses had significantly higher mean birth weight and head circumference[3,11].

By studying the correlation between neonate gender and other neonatal parameters like Apgar score <7 at 1mint, Apgar score <7 at 5 mint, admission to NICU, clear liquor, and Meconium liquor it was that there is no correlation between fetal gender and these parameters except there is a positive correlation between male gender and Apgar score <7 at 1 mint. This agree with Michela, *et al.*, (2012) who proved that 5-minute Apgar score and NICU admission rates were not different in relation to fetal sex, on the other hand disagree with him about what he found that presence of Meconium stained liquor occurred significantly more frequently in women carrying males than in those carrying females[8]. Also agree with Lieberman, *et al.*, (1997) who found that males were more than three times as likely than females to have an Apgar score < or = 7 at 1 minute [10].

In conclusion, no correlation between fetal gender and any pregnancy or neonatal outcome except a positive correlation between male gender and low 1-minute Apgar score which can not depend on it largely because the study's drawback which include limitation of sample, short duration of study, policy of the hospital that not included the instrumental deliveries in the protocol of management of labour and delivery.

Further studies with a sample large in number are needed to confirm the same results in order to approve or disapprove these findings.

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