

## Advance Maternal Age and Pregnancy Outcome

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### Abstract

**Objective:** The changing patterns of becoming pregnant at an advanced age have serious public health impact because of increased risk of adverse pregnancy outcome. Thus the objective of this study was to find the adverse pregnancy outcome of advance maternal age and to estimate whether it was related to inter-current illness and pregnancy complications.

**Study design:** This prospective comparative study was conducted at labor room in AL-Mawany General Hospital from October 2011 – October 2012. A comparison of pregnancy outcome was made on bases of maternal age at delivery and divided into (group A:20-34 years old),(group B:35-40 years old),(group C:above 40 years old). Main outcome measures were perinatal outcomes include intrauterine death, neonatal death, preterm birth, congenital malformation, macrosomia, low birth weight and fetal distress by apgar score. The obstetrical outcomes, which include abortion, mode of delivery, antipartum hemorrhage, hypertension disorder, diabetic mellitus, postpartum hemorrhage and multiple pregnancy.

**Result:** There were 14350 subject delivered at Al-Mawany General Hospital were choosing about 534 subject whom meet the inclusions criteria, selected women divided in to 3 groups: A: 20-34 years (NO.252,47%),B:35-40 years (NO.171,32%) and C: above 40 years (NO.111,20%). The frequencies of macrosomia, intrauterine death, congenital malformation and low apgar score was significantly higher in advanced maternal age. The finding reveal that mother over 35 years showed more risk for abortion, hypertension disorder , multiple pregnancy antipartum hemorrhage, postpartum hemorrhage and caesarean section.

**Conclusions:** We conclude that older women managed properly by modern obstetric methods and delivered in modern health care center can expect good pregnancy outcome.

### الخلاصة

الهدف من الدراسة: دراسة تأثير تقدم عمر الأم على نتائج الحمل وتدخلات الولادة. تصميم الدراسة: دراسة مقارنة وصفية حاله أجريت في مستشفى الموائى العام قسم النسائية والتوليد في الفترة من بداية شهر تشرين الأول 2011 ولغاية بداية شهر تشرين الأول 2012. نتائج الدراسة : وجدت الدراسة ان النساء كبار السن أي اللواتي في سن 35 سنة فما فوق هن أكثر عرضة لحدوث بعض الاختلاطات الطبية أثناء حدوث الحمل في هذه الأعمار مثل ارتفاع ضغط دم الحمل, حالات الإجهاض , حالات حمل التوأمية , حالات نزع ما قبل الولادة وما بعد الولادة , وكذلك وجدت الدراسة انهن أكثر عرضة لولادة أطفال زائدين الوزن وولادات متأخرة والتشوّهات الخلقية مع الموت المبكر للجنين قبل الولادة . الاستنتاجات : وجدت الدراسة بأن النساء المتقدمات في السن والمعالجات بالوسائل الحديثة واللواتي يلدن في ظل مراكز رعاية صحية جيدة يمكن لهن أن يتوقعن نتائج حمل مقبولة .

### Introduction

It has been widely documented that maternal age in pregnancy is increasing in the world. Nowadays, many women delay their pregnancy even up to the 40th year of their life because of different reasons, such

as occupational, educational and economical. Therefore complete awareness of pregnancy outcomes in these age for the midwives and gynecologists is needed to protect the health of the mother and infant<sup>(1)</sup>. Advanced maternal age, usually defined as age 35 years or more

for the mother at time of delivery of her baby<sup>(2)</sup>. The definition of advanced maternal age in the obstetric literature is variable most have designed a lower limit of 35 year, while others used 40 years<sup>(3,4 and 5)</sup>. Effective birth control, advances in Assisted Reproductive Technology (ART), delayed marriage, increasing rates of divorce followed by remarriage, and women's higher education all may contribute to this trend<sup>(3)</sup>. Many of them experience pregnancy unwillingly because of negligence using contraceptive methods<sup>(6)</sup>. The number of babies born to women in their late 30s has progressively increase over the past decade. According to the report of Iran's statistic center, the average age of first marriage was increased to 4.7 years from 1957 to 2002<sup>(7)</sup>. In Sweden, the numbers of women giving birth between 40 and 44 years of age and at age 45 or older increased from 5.0 to 10.3 and from 0.2 to 0.5 live births per 1,000 women, respectively, from the early 1980s to 2001<sup>(8)</sup>. In England and Wales, the number of women giving birth between 40 and 44 years and at 45 years or older increased from 5.1 to 8.4 and 0.3 to 0.5 live births per 1,000 women, respectively, between 1991 and 2001<sup>(9)</sup>.

It has been widely documented that advanced maternal age confers risk to both mother and child's health<sup>(7)</sup>. Most studies have evaluated outcome in pregnant women aged 35 years or older. It has been shown that pregnant women aged 35 years or older experience an increased risk of intrauterine fetal death, pregnancy-induced hypertension, gestational diabetes, operative vaginal delivery and caesarean delivery<sup>(10)</sup>, antipartum hemorrhage, malpresentation, low birth weight baby and preterm delivery<sup>(11)</sup>. In aged women, who are suffering from chronic diseases or who have weak physical position, the probability of these risks is more<sup>(7)</sup>. It is unfortunately true that pregnant women with advanced age have had more chance to develop medical disorders such as

diabetes, high blood pressure or other chronic diseases, which can affect pregnancy and birth. Advance maternal age is also a risk indicator for other pregnancy complications including spontaneous miscarriage and ectopic pregnancy<sup>(12)</sup>. It is well-known that older women have a higher chance of having a baby with a genetic abnormality, such as Down's syndrome, Edwards' syndrome or Patau's syndrome. In England and Wales show, the chance of having a baby with a genetic abnormality rises from 1 in 500 between the ages of 35-39, to 1 in 250 between 40-44, up to approximately 1 in 70 in age 45 or over<sup>(13)</sup>. Despite the increased risk with increased age, it is important to remember that the vast majority of babies are fine. Except for the factor of chromosomal abnormalities, figures suggest that babies of older mothers are no more at risk of most birth defects than those of younger mothers<sup>(13)</sup>. There is increased rate of intervention of labor with the increasing age of the mother, like induced labor, an epidural, or forceps or ventouse delivery<sup>(14)</sup>. **Virtually** all studies agree that the rate of caesareans section also rises with maternal age, the caesareans rate in the general population of the United State is all most 30% compared to 50% in women aged 30-35 years and 80% in women aged 40-50 years<sup>(15,16)</sup>.

### Aim of the study

To clarify the influence of maternal age on obstetric and perinatal outcomes in old aged women mainly aged more than 40 years and to estimate whether adverse outcome was related to inter-current illness and pregnancy complication.

**Patients and Methods:** This study is a prospective comparative study was done at Al-Mawany General hospital, department of obstetrics and gynecology at labor ward at which the majority of pregnant women are attending it for deliveries and for other pregnancies complications.

The study extended through (12) months started from October 2011 to October 2012, there were 14350 deliveries, (533) pregnant women were selected based the inclusion criteria and divided into 3 groups according to the maternal age:- group-A: (20-34) years old, group-B: (35-40) years old and group-C: (above 40) years old.

The exclusion criteria: Pregnant women below 20 years were excluded from this study also women with history of urinary tract infection, cardiac problems, recurrent miscarriage, anemia and previous preterm labor. The inclusion criteria for studied group involved the maternal age, parity which categorized into nulliparous (no previous birth) and multiparous (at least previous one birth). The gestational age determined by last menstrual period or by ultrasound. Antenatal complications of pregnancy were recorded either from antenatal care or from history taken.

Obstetric complication during current pregnancy includes (miscarriage, hypertension disorder, gestational diabetes mellitus, antipartum hemorrhage whether placenta previa or abruptio placenta and post-partum hemorrhage), were recorded.

Blood pressure was measured for all pregnant women included in this study, the diagnosis of hypertension based on either one measure of diastolic blood pressure of 110 mmHg or more, or two measures of diastolic blood pressure of 90 mmHg on two occasions 6 hours apart, urine sample for all pregnant women included in this study for protein and blood samples were aspirated for blood sugar. Baseline data were recorded with a questionnaire and patient interview. Post-delivery follow-up was performed few hours after delivery.

All deliveries were recorded by the investigator to determine the mode of delivery whether spontaneous vaginal delivery, cesarean section, instrumental vaginal delivery and assistant vaginal breech delivery.

The following adverse pregnancy outcomes were considered and compared in the subjects studied:

-Miscarriage (fetal loss after **employment** but before 24 weeks).

-Gestational hypertension (blood pressure >140/90 on at least two occasions greater than 6 hours apart without evidence of chronic hypertension or signs of proteinuria).

-Preeclampsia (criteria for gestational hypertension and significant proteinuria).

-Diabetes mellitus include gestational diabetes and chronic diabetes mellitus by measure the time random blood sugar for all studied group.

-Preterm delivery (delivery before 37 weeks of gestation).

-Post term delivery (delivery after 42 weeks of gestation).

-Low birth weight (birth weight <2500 gram).

-Macrosomia (birth weight >4500 gram).

-Placenta abruption (premature separation of normally implanted placenta).

-Placenta previa (placenta completely or partially covering the internal cervical os at the time of delivery).

-Postpartum hemorrhage (excess blood loss after delivery, more than 500ml after vaginal delivery and more than 1000 ml after cesarean delivery).

-Cesarean delivery (is a surgical procedure in which incisions are made through a mother's abdomen (laparotomy), and instrumental vaginal delivery (delivery of a baby vaginally using an instrument for assistance).

-Apgar score at 1 minute and 5 minute, if less than 4 in one minute and less than 7 in five minutes was taken as evidence of birth asphyxia.

Statistical analysis was performed to evaluate the effect of maternal age on specific pregnancy outcome, considered separately. All analyses were performed with spss version-15. The pregnancy outcomes considered statistically significant at an  $\alpha$ -level of 5% ( $p < 0.05$ ).

**Result**

In this prospective descriptive study in 2012, 14350 deliveries in Almayany General Hospital. (530) pregnant women

were selected according to the inclusion criteria .selected women divided into 3 age group :Group A:(47%),(NO.250), Group B:(32%), (NO.170), Group C: (20%), (NO.110) .

Table 1. Demographic characteristics of women grouped according to age and parity.

parity	Group-A Age20-34 years (n=250) (47%)		Group-B age 35-40years (n=170) (32%)		Group-C age >40 years (n=110) (20%)		p-value
	NO.	%	NO.	%	NO.	%	
nillparous	95	38	30	17.6	9	8.1	0.446
multiparous	155	62	140	82.3	101	91.8	0.023

Table 1 show significant increase of the parity in advanced age groups ( B and C).

Table 2. Maternal complication during pregnancy and labor.

complication	Group-A Age20-34 years (n=250)		Group-B age 35-40years (n=170)		Group-C age >40 years (n=110)		p-value
	no	%	No	%	no	%	
Abortion	12	4.8	15	8.8	10	9	0.043
Twin	9	3.6	10	5.8	8	7.2	0.039
Hypertension disorder	22	8.8	25	14.7	25	22	0.012
Diabetes mellitus	23	9.2	23	13.5	16	14.5	0.225
Preterm labour	15	6	11	6.4	8	7.2	0.409
Antepartum hemorrhage	20	8	20	11.7	17	15.4	0.016
postpartum hemorrhage	22	8.8	23	13.5	18	16.3	0.015

Table 2 describe the serious obstetrical and medical complication occur during pregnancy according to maternal age, it was revealed that miscarriage , multiple pregnancy , hypertension, Ante partum hemorrhage and postpartum hemorrhage (post partum hemorrhage mostly due to atonic uterine contraction) were statistically significant in advanced age groups.

Table 3. classification of hypertension disorder

<b>Hypertension disorder</b>	Group-A Age20-34 years (n=250)		Group-B age 35-40 years (n=170)		Group-C age >40 years (n=110)		P-value
	NO.	%	NO.	%	NO.	%	
Preeclampsia	20	8	16	9.4	10	9	0.583
Essential hypertension	0	0	9	5.2	15	13.6	0.0001

Table 3 Describe the types of hypertension disorder during pregnancy among the studied groups , the occurrence of preeclampsia were not significantly different in 3 groups while the essential hypertension is statically higher in advanced maternal age ( group B and C ) .

Table 4. Causes of antepartum hemorrhage.

causes of antepartum hemorrhage	Group-A Age 20-34 years (n=250)		Group-B age 35-40 years (n=170)		Group-C age >40 years (n=110)		p-value
	NO.	%	NO.	%	NO.	%	
Placenta previa	14	5.6	9	5.2	7	4	0.883
Placenta abruption	8	2	11	6.4	10	9	0.045

Table 4 the types of antipartum hemorrhage illustrated in this table shows the Placenta abruption is significant cause of antipartum hemorrhage in advance maternal age.

Table 5. Mode of delivery .

Mode of delivery	Group-A Age 20-34 years (n=250)		Group-B age 35-40 years (n=170)		Group-C age >40 years (n=110)		P-value
	NO.	%	NO.	%	NO.	%	
Normal vaginal delivery	180	72	90	52.9	32	29.9	0.883
Caesarean section	51	20.2	56	32.9	56	50.9	0.0001
Vacum assistance delivery	3	1.2	4	2.3	5	4.5	0.348
Vaginal breech delivery	4	1.6	5	2.9	7	6.3	0.051

Table 5 Shows increase rate of caesarean section in advanced maternal age (group B and C) and it was statistically significant among three groups selected in this study in compare to normal vaginal deliveries.

Table 6. Neonatal outcome.

Neonatal outcome.	Group-A Age 20-34 years N=250		Group-B age 35-40 years N=170		Group-C age >40 years N=110		P-value
	NO.	%	NO.	%	NO.	%	
Birth wt.>4.5kg	13	5.2	30	17.6	20	18	0.0001
Birth wt.<2.5kg	35	14	40	23	22	20	0.054
Gestational age >42wk	19	7.2	25	14	21	19	0.005
Gestational age <37wk	39	15.6	40	23	23	20.9	0.102
One minute apgar<4	20	8	30	17.6	25	22.7	0.0001
five minute apgar<7	40	16	45	26.4	28	25.4	0.085
Congenital anomalies	30	12	35	20.5	24	21.8	0.004
Intrauterine death	6	2.4	14	8.2	10	9	0.001

Table 6: illustrate the Neonatal outcome, the statistically significant difference among three groups were:- fetal birth weight above 4.5 kg , postdate delivery, low apgar score at one minute , congenital abnormality and intrauterine death were higher in advanced maternal age (group B and C ).

## Discussion

In recent years couples in industrialized nation have been chosen to post bond marriage and child bearing. The maternal age of 35 years still stand as a risk point in perinatal surveillance because of this being high risk group with their own set of risk factors besides all of other risks of pregnancy and delivery<sup>(7)</sup>. However recent studies suggest that, most women aged more than 35 years have healthy pregnancies and babies<sup>(9)</sup>. In Iraq, many

women continue to have children because of cultural attitude towards large families or because the decision is not theirs to make .

In our study hypertensive disorders in general increase in studied group include essential hypertension which is statistically significant especially in maternal age > 40 years. Essential hypertension is medical complication which is often develops with advanced maternal age, in pregnancy this high blood pressure may exacerbate complications like significant proteinuria and develops preeclampsia which is leads to affect the pregnancy outcome (mode of delivery and neonatal complication). This result of our study goes with study done at 2008 in Basrah Maternity and Child hospital<sup>(17)</sup>. and study done by Aghamohammed (2011) in Iran found that preeclampsia increase with increase maternal age<sup>(7)</sup>. The basic reason for increase preeclampsia in elderly women was still unknown; some studies discuss that the probability of aged women's infections has a relationship with a lot of pathogens that stimulate their immune system for increasing risk of preeclampsia in them<sup>(18)</sup>.

While a study done by Minoorajaeetal (2009) found that hypertension disorder was not higher in young women, neither was it significantly higher in older mother, this can be related to the socioeconomic status or ethnicity<sup>(6)</sup>.

In this study findings showed that increase in percentage of gestational diabetes mellitus in maternal age above 35 years in compare with younger aged women but it was statistically non-significant, the present study is in agreement with Namavar etal. and Goldman etal. Studies showed that higher incidence of maternal medical disease such as hypertensive disorder and diabetes was seen among advance aged mother other than among the young mothers<sup>(16, 19)</sup>.

The main cause of antipartum hemorrhage in advanced maternal age is mainly placental abruption in our study and it was

statistically significant in maternal age above 35 years

The primary causes of placental abruption is unknown ,but there are several associated condition like the maternal age ,the same observation was confirm with placenta previa<sup>(19)</sup>. Our result goes with studies done by Minoorajaeetal<sup>(6)</sup>, Gilbert WM etal<sup>(4)</sup>, Bianco, A etal<sup>(2)</sup>.

In this study there is no significant difference in placenta previa among studied groups this result is in agreement with study done by Michael F (2006) did not find any meaningful difference from placenta previa in aged women in compared with young women<sup>(20)</sup>. The common cause of placenta previa is previous caesarian section in all aged group of pregnancy, advanced maternal age per se not effect increase risk of placenta previa.

Regarding to the postpartum hemorrhage, in present study there is significant difference in maternal age above 35 years and young aged women. This result goes with study done by Rosenthal, A.N. and Paterson Brown, S.<sup>(11)</sup>. The explanation is that myometrial function is deteriorated with age .This mechanism may also be relevant to the increased age-related risk of breech presentation and postpartum hemorrhage, as uterine atony is the most common cause of postpartum hemorrhage<sup>(11)</sup>.

The greatest difference between older women and control group were identified in the mode of delivery, this present study showed that there was statistically meaningful relation between the age over 35 and cesarean section ( $p < 0.0001$ ). Michael etal reported the rate of increase cesarean section in aged women and claimed that there would be many reason for this, including medical disease, obstetric complication and neonatal problem with increasing age of women<sup>(20)</sup>.

Advanced maternal age above 35 year associated with low risk of preterm labor in

present study, this result differs with study done by Heffner et al and Azar et al (2011)<sup>(21, 7)</sup>.

The risk of intrauterine death was significantly higher in the older women and also congenital abnormalities in the present study, these results are in agreement with study done in Basrah Maternity and Child Hospital at (2008)<sup>(17)</sup> and Jacobsson et al (2004)<sup>(22)</sup>.

High parity and advanced maternal age are now well established risk factors for intrauterine death due to the increased pregnancies of malformation fetuses<sup>(20)</sup>.

There was a wider distribution of birth weight in the older women. The increased likelihood of older women delivering a small for gestational age baby may be related to poorer placental perfusion or trans-placental flux of nutrients (Godfrey et al.)<sup>(23)</sup>.

This result is not in agreement with our result, in this study which was no significant difference among low birth weight in older age women, also Ziadeh S et al study showed that there was no difference between the averages of infant weight in aged women with young women<sup>(24)</sup>.

However in our study found that macrosomia (birth weight above 4.5 kg) significantly higher in older aged women compare with young aged, this result is in agreement with study done by Maresh et al.<sup>(25)</sup>. Macrosomia caused by many risk factors but increase maternal age is the main risk factor, this may be due to age related changes in maternal metabolism<sup>(25)</sup>. In this study there was increased risk of miscarriage and twin pregnancy, (most of twin pregnancy in this study spontaneously without ovulation induction), same result was found in study done at Basrah Maternity and Child Hospital (2008)<sup>(17)</sup> and Fretts RC et al. they found that there is increased risk of twin pregnancy in women above 35 years and increase risk of miscarriage in aged women from 8.7% by age of 22 years to 84% by aged 48 years<sup>(5)</sup>. Maternal age is an independent risk factor for miscarriage.

Advanced maternal age leads to a decrease number of good quality oocytes and an increased risk of miscarriage<sup>(26)</sup>.

## Conclusion and recommendation

1-the pregnant women of advanced age, in good health, do not need a special care beyond normal obstetric practice, advances in medical care now help women in their late thirties and forties to have safer pregnancy than in past.

However, women should be aware of the risks associated with delayed child bearing so; they can make informed decisions on when to start their family.

2- Activation the role of pre-pregnancy clinic for such high risk age group.

3-genetic counseling is standard of care offered to any women above 35 year or elder.

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