

Maternal Age As An Obstetric Risk Factor: Perinatal Outcomes In Elderly Pregnant Women

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Abstract:

Background: Delayed childbearing represents a phenomenon that increasing worldwide. Advanced maternal age have shown to complicate and worsen the pregnancy outcome and associated with morbidity and mortality.

Objective:To study the relationship of maternal age as an obstetric risk factor with perinatal outcomes in elderly pregnant women

Subjects and Method: we conducted a cohort study at the Obstetrics and Gynecology Service of our Hospital for in one year (since March 1, 2018 to March 1, 2019). Included 100 Iraqi pregnant women at age of 35 or older as (study group) and 100 Iraqi pregnant women at age of 20-34 years as control group, both groups gave birth in our hospital during the same period of time.

Results: The baseline characteristics of the studied groups were not significantly different except body mass index which was significantly higher in study group than controls, ($P < 0.05$). Pregnancy induced hypertension and gestational diabetes mellitus were more frequent in women at or older than 35 years old, antepartum hemorrhage, puerperal complications, lack of progression of labor and cesarean sections compared to controls, ($P < 0.05$). Low birth weight and lower Apgar scores were more frequent in neonates of older women, ($P < 0.05$). Also these neonates more likely to have respiratory distress, need more admission to NICU and had higher mortality rates than control group, ($P < 0.05$).

Conclusions: Maternal age of 35 years or older is associated with adverse maternal and neonatal pregnancy outcomes. Maternal age of 35 years or older and overweight\obesity were significant determinants and risk factors of adverse perinatal outcomes.

Keywords: Pregnancy in elderly women, Delayed childbearing, perinatal outcome, adverse obstetrical outcome

Introduction:

Late childbearing represents a significant health problem worldwide. There is an intense change in the reproductive behavior and become a real challenge in developed and developing countries, where the cumulative incidence rates of births to women aged 40 years or older are continue to increase with a growing numbers of births to these women. Since the mid-1990s, the age of childbearing has continued to increase worldwide despite the birth control programs and family size controls legislations (1,2). Currently, large

number of women try to postpone their child birth until later in their life (3,4) . Delayed motherhood has become a common phenomenon in the developed world as a result of social, educational, and economic factors. The desire of women to have a pregnancy after 35 and even 40 years has therefore become an important social phenomenon (5–7).

Pregnancy in elderly women also called elderly primigravida has been defined as pregnancy occurs for first time at or after age of 35 years (8). The change in the reproductive pattern attributed to many determinants, including social, economic and other factors (9–11). There is a large evidence that the risk of morbidity and mortality due to pregnancy increases by almost three times in women at or older than 35 years compared to younger age group (12). Pregnancy before 18 and after 35 years is associated with increased maternal and perinatal risk. Pregnancy in women 35 years of age or older is associated with an increased risk of presenting a series of pathologies typical of pregnancy and a greater frequency of chronic maternal pathologies, which result in a greater probability of maternal and perinatal death.

The upper age limit, from which the elderly pregnant patient is considered, has varied throughout history and continues to be an important source of controversy even today. However, it is unanimously accepted that women who give birth at ages close to the fertility limit have higher maternal-fetal morbidity and mortality, without being well established whether this is due to age exclusively or to other associated risk factors (11–13). As age advances, the chances of a woman becoming pregnant decrease, motivated by the deterioration in the quality of her eggs, especially those waiting to obtain offspring, until perimenopause. The high abortion rate contributes significantly to decreased fertility among elderly women (14–16).

Because pregnancy in older women is inherently associated with a higher incidence of chronic diseases, the outcome of these pregnancies has raised the concern of the medical community (17).

Advanced maternal age could be associated with many complications and adverse pregnancy outcomes could be occur among mothers older than 35 years. Many researches and literatures evaluated the relationship between advanced maternal age and severe maternal morbidity and health problems; among these comorbidities it has been found that advanced maternal age at pregnancy significantly associated with gestational diabetes , Preeclampsia, placental pathologies and disorders, higher rate of cesarean sections, premature labor, lower birth weight, intrauterine fetal growth restriction and death, ectopic pregnancy, long postpartum hospital stay, high risk of perinatal mortality and congenital malformation of newborns (18–21).

Previous studies and literatures have investigated the relationship between maternal age and pregnancy outcomes , nonetheless, these studies vary in the design, population and the definition of pregnancy in elderly which lead to difficult comparison and interpretation of findings , thus this subject still need further assessment

, hence, the objective of this work has been to determine the current status of this problem in our environment, analyzing the perinatal results in pregnant women aged 35 years or older.

Subjects and methods

We have carried out a cohort study of a group of Iraqi women at age of 35 or older, who gave birth in our Obstetrics and Gynecology Services of our Hospital for in one year (since March 1, 2018 to March 1, 2019). As a control group, we include through systematic sampling those pregnant women under 35 years of age who gave birth in the last ten days of each month during the same period of time. This project was ethically approved by the Obstetrics and Gynecology department, and administration of our hospital, for this purpose a database was created in which various variables related to epidemiology, gestation progression and perinatal outcomes were registered.

During the study period we investigated two groups of patients in a cohort study design, the two groups were

Study group; included, **100 deliveries** corresponded to women aged 35 years or older during the study period.

Control group: Included, **100 deliveries** corresponded to women younger than 35 years.

Women in both groups were selected when they are eligible according to our inclusion and exclusion criteria.

Inclusion criteria:

1. Iraqi pregnant women at first trimester of gestation.
2. Singleton pregnancy
3. At the specified age (at or older than 35 years) for study group and 18-34 years (for controls)
4. Agreed to participate in the study.
5. Naturally conceived without ART or other assisted reproductive medications

Exclusion criteria:

1. Multiple pregnancies
2. Fetal intrauterine growth restriction
3. Placental abnormalities or pathologies
4. History of Bleeding during pregnancy
5. Intrauterine infection
6. Proved chromosomal or congenital anomalies in previous gestations
7. Undertrained gestational age
8. Women who missed-to-follow up
9. Pre-gestational hypertension or diabetes mellitus

In order to comply with the outlined objectives, multiple variables were evaluated, namely: residence, education, occupation, gravidity, parity, abortion, body mass index, gestational age at birth, mode of labor, maternal intrapartum and postpartum data and maternal and neonatal outcomes. Variables summarized as frequencies and percentage for qualitative variables and as mean and standard deviation for quantitative variables as a summary measure. For the comparison of the groups, the chi-square test (χ^2) was used. For the continuous quantitative variables the Student's t test was used to compare two means. Preliminary statistical techniques were used to carry out the tests described in the previous sections, to ensure compliance with the statistical assumptions. Data analysis was performed using the statistical package for social sciences (SPSS) version 26 for Windows. Moreover, binary regression analysis was performed to assess the covariates of adverse outcomes, the Odds (RR) was used to identify risk factors and its 95% confidence interval. All the statistical tests performed with the outcome variables, at statistical significance level of 0.05.

Results

In this study both groups were almost matched for their demographic variables including residence, level of education and occupation, no significant differences, ($P>0.05$). Body mass index was significantly higher in study group than controls and the prevalence of overweight/obesity was significantly higher in study group than controls, 51% vs. 35%, respectively, ($P<0.05$).

Neither Gravidity, Parity nor history of abortion significantly different between both groups, ($P>0.05$), (Table 1). Disorders reported during pregnancy included Gestational hypertension, Gestational DM and Amniotic fluid abnormality, all were significantly more frequent in women at or older than 35 years than those who were younger than 35 years, however, the difference was significant in the frequency of gestational hypertension and gestational diabetes mellitus (GDM), ($P<0.05$), but it was not in amniotic fluid abnormality ($P>0.05$), (Table 2).

In the study group (age ≥ 35 years), antepartum hemorrhage (APH) was significantly more frequent than controls, 16% vs. 5%, respectively, ($P<0.05$). Puerperal complications were also more frequent in study group, ($P<0.05$). Postpartum hemorrhage was less frequently reported in elderly women than controls, ($P<0.05$). No significant difference in the frequency of premature rupture of membrane (PROM) between both groups, ($P>0.05$), (Table 3).

As shown in (Figure 1) the mean gestational age at birth was 38.3 ± 2.4 weeks in the study group compared to 39.2 ± 2.2 in controls with a significant difference, ($P=0.006$). Moreover, preterm and post term labor were more frequent in study group than controls, however the difference did not reach the statistical significance ($P>0.05$). Lack of progression of labor was significantly less frequent in study group than controls; 11% vs. 23%,

respectively, ($P < 0.05$). Caesarean sections were more frequent in study group, (53%) compared to controls (39%) with significant difference, ($P < 0.05$). All these findings are displayed in (Table 4). Regarding neonatal outcomes in our study, the mean birth weight was significantly lower in study group than controls, 2792 gram vs. 2992 gram, respectively, ($P < 0.05$). Proportion of newborns with Apgar score of less than 7 at 1st minutes was 31% in study group which was higher than that in controls, 22%, ($P < 0.05$). Similarly, Apgar score at 5 minutes below 7 was more frequent in study group (15%) than controls (6%), ($P < 0.05$). These findings are shown in (Table 5).

In total, the overall adverse maternal and neonatal outcomes rates were significantly higher in older women (≥ 35) than controls (younger than 35 years), ($P < 0.05$), (Table 6).

Further analysis performed to assess the significance of correlation of predictors of adverse maternal and neonatal outcomes, using binary regression analysis. Results of these analyses revealed that age was the stronger predictor of adverse pregnancy outcomes in both mothers and neonates. For maternal adverse outcomes, it had been found that older age women were about 3-fold more likely to have adverse outcomes compared to younger women (OR= 3.03, P. value < 0.05). Also larger BMI appeared to be significant predictor of adverse outcome (OR of 2.51, $P < 0.05$). Other variables showed weak non-significant correlations, ($P > 0.05$), (Table 7). Similarly, older age and higher BMI were significant predictor of adverse neonatal outcomes. Maternal age showed an OR of 3.9 indicated that neonates of older women were about 4-fold more likely to have adverse outcomes and complications, ($P < 0.05$). BMI showed an OR of 1.93 ($P < 0.05$). Other variables showed weak non-significant correlation with adverse neonatal outcomes, ($P > 0.05$), (Table 8).

Table 1. Baseline characteristics of the studied group

Variable		Study group (age ≥ 35 years)		Controls (age < 35 years)		P. value
		No.	%	No.	%	
Residence	Urban	81	81.0	84	84.0	0.709 ns
	Rural	19	19.0	16	16.0	
Education	Educated	77	77.0	80	80.0	0.730 ns
	Non-educated	23	23.0	20	20.0	
Occupation	Employed	27	27.0	33	33.0	0.440 ns
	Housewife	73	73.0	67	67.0	
BMI	Overweight/ Obese	51	51.0	35	35.0	0.032 sig
Gravidity	1 - 2	55	55.0	61	61.0	0.136 ns

	3 - 4	29	29.0	32	32.0	
	> 4	16	16.0	7	7.0	
Parity	Nulliparous	42	42.0	48	48.0	0.477 ns
	Multiparous	58	58.0	52	52.0	
History of Abortion	Yes	15	15.0	8	8.0	0.392 ns
	No	85	85.0	92	92.0	

Table 2. Gestational disorders of the studied groups

Variable	Study group (age ≥ 35 years)		Controls (age < 35 years)		P. value
	No.	%	No.	%	
Gestational hypertension	24	9.0	8	8.0	0.004 sig
GDM	13	13.0	4	4.0	0.022 sig
Amniotic fluid abnormality	7	7.0	4	4.0	0.535 ns

Table 3. Perinatal complications of the studied groups

Variable	Study group (age ≥ 35 years)		Controls (age < 35 years)		P. value
	No.	%	No.	%	
APH	16	16.0	5	5.0	0.021 sig
PPH	3	3.0	8	8.0	0.031 sig
Puerperal complications	8	8.0	3	3.0	0.041
PROM	13	13.0	14	14.0	1.00 ns

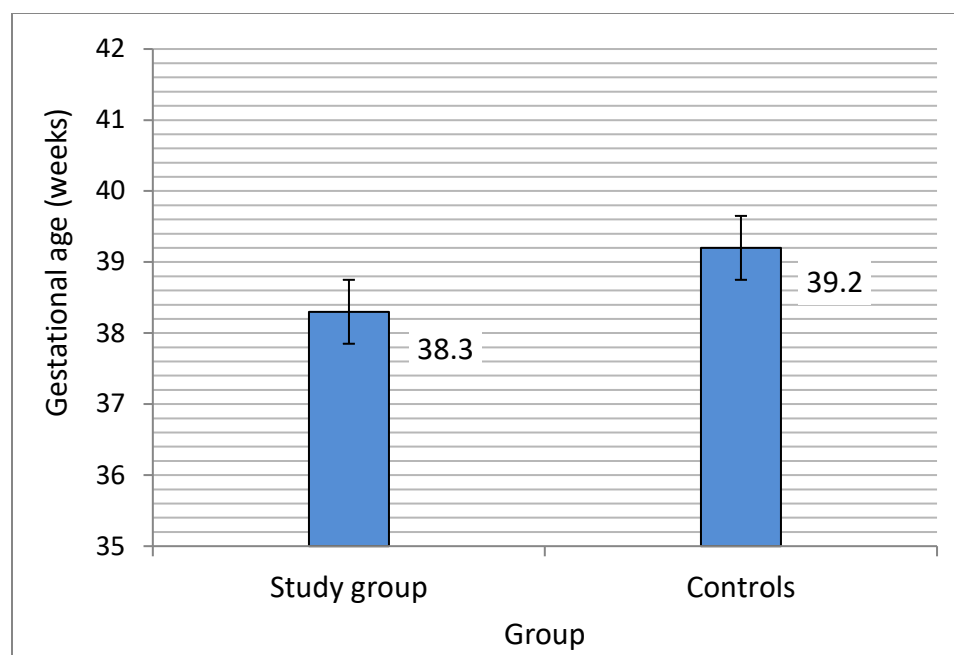


Figure 1. Comparison of mean gestational age at delivery of the studied groups

Table4. Perinatal outcomes of the studied groups

Variable		Study group (age ≥ 35 years)		Controls (age < 35 years)		P. value
		No.	%	No.	%	
Gestational age at delivery	Preterm	10	10.0	12	12.0	0.331 ns
	At term	84	84.0	86	86.0	
	Post term	6	6.0	2	2.0	
Lack of progression of labor		11	13.0	23	22.0	0.036 sig
Mode of delivery	Normal	49	49.0	61	61.0	0.008
	Caesarean sections	53	53.0	39	39.0	sig

Table 5 . Neonatal outcomes of the studied groups

Variable	Study group (age ≥ 35 years)		Controls (age < 35 years)		P. value
	No.	%	No.	%	
Mean birth weight (SD) gram	2792 (280)	-	2992 (317)	-	0.001sig
Apgar score at 1st min below 7	31	31.0	22	22.0	0.031 sig
Apgar score at 5 minute below 7	15	15.0	6	6.0	0.001 sig
Respiratory distress	11	11.0	5	5.0	0.192 ns
Congenital anomalies of newborn	3	3.0	0	0.0	0.244 ns
Admission to NICU	17	17.0	8	8.0	0.0435 sig
Neonatal mortality	6	6.0	1	1.0	0.048 sig

Table 6. Overall adverse maternal and neonatal outcomes of the studied groups

Variable		Study group (age ≥ 35 years)		Controls (age < 35 years)		P. value
		No.	%	No.	%	
overall Adverse maternal outcome	Yes	51	51.0	32	32.0	0.004 sig
	No	49	49.0	68	68.0	
Overall Adverse neonatal outcome	Yes	34	34.0	19	19.0	0.012 sig
	No	66	66.0	79	79.0	

Table 7. Results of bivariateregression analysis for the predictors of adverse maternal outcomes

Variable	B	OR	95% CI of OR	P. value
Maternal age	1.11	3.03	1.72 - 6.13	0.001 sig

Residence	0.11	1.12	0.81 - 2.14	0.426 ns
Education	-0.81	0.44	0.18 - 1.66	0.532 ns
Occupation	-0.44	0.64	0.31 - 1.73	0.478 ns
BMI	0.92	2.51	1.40 - 4.89	0.001 sig
Gravidity	0.21	1.23	0.45 - 2.36	0.294 ns
Parity	0.36	1.43	0.71 - 3.12	0.187 ns
History of Abortion	0.16	1.17	0.52 - 1.93	0.422 ns
Mode of delivery	0.71	2.03	0.82 - 5.24	0.218 ns

Table 8. Results of Bivariate Regression analysis for the predictors of adverse Neonatal outcomes

Variable	B	OR	95% CI of OR	P. value
Maternal age	1.36	3.90	2.02 - 7.48	0.001 sig
Residence	0.16	1.13	0.65 - 1.96	0.492 ns
Education	0.10	1.11	0.22 - 1.66	0.605ns
Occupation	0.07	1.01	0.17 - 1.91	0.522 ns
BMI	0.66	1.93	1.33 - 4.12	0.001 sig
Gravidity	0.19	1.16	0.32 - 1.75	0.307 ns
Parity	0.24	1.29	0.48 - 2.03	0.213 ns
History of Abortion	0.20	1.21	0.31 - 1.44	0.466 ns
Mode of delivery	0.12	1.07	0.55 - 1.63	0.281 ns

Discussion

The interest in reducing perinatal morbidity and mortality rates has led to studies aimed at identifying possible risk factors that influence the occurrence of adverse obstetric and neonatal outcomes, with maternal age being considered one of them by many authors(22–25) .

The age limit that is considered adequate for the achievement of pregnancy has varied over time and there is no unanimity in this regard. Currently, this limit is established at 35 years, although there is no shortage of studies that place it over this age. According to data from the European countries (26), The maternal age at the time of first birth has increased in recent decades, there has been a progressive increase in all member states.

In this study, the 35-year-old criterion was followed assuming that this cut-off point has been established by consensus and does not respond to epidemiological criteria of associated increased risk and many studies used this cutoff value (12,27,28).

In our study we found that baseline characteristics of the studied groups were not significantly different except in BMI where the prevalence of overweight and obesity was higher in women older than 35 years (the study group) than controls, this was not unexpected, and it was proved by other studies that overweight and obesity rates increased with advancing maternal age (29)

We have found an association between advanced maternal age and an increased risk of developing gestational pathologies, such as diabetes or hypertensive states of pregnancy. The rate of gestational diabetes in our study group (older than 35 years) was (13%) compared to 4% in the control group, also gestational hypertension was significantly associated with older maternal age. Our finding consistent with that reported by other series, there are many studies that have verified an increase in the incidence of DM and hypertension in pregnant women from the age of 35 with rates comparable from one author to another. In a previous retrospective study included more than 8 millionsingleton pregnancies, the rates of pregnancy associated hypertension was significantly increased with advancing age (30). Similar findings also reported in other two studies from United Kingdom, Malaysia, Saudi Arabia and Turkey, and Ethiopia (31–35). Based on these results, we recommend the importance of performing the gestational diabetes screening test and an exhaustive control of blood pressure in all pregnant women, especially the elderly.

In our study we found that incidence of APH and puerperal complications were higher while incidence of PPH was lower in older women than controls. These findings in line with that reported by other studies; in a case control study conducted by Dibaba et al. (36) mothers aged 35-44 years were about 4 times more likely to have APH than younger women. Liu et al.(37) found that age < 18 years was significant risk factor for PPH. Lao et al. (38) documented that the risk of PPH decreased significantly with advancing maternal age. Labor and delivery complications are widely attributed to advanced maternal age in previous studies (35,39,40) which supported our findings. Although in this study we have not found a higher frequency of prematurity, we have found a higher risk of preterm birth that requires hospital admission and specific treatment. The increase in prematurity in elderly pregnant women has been documented by other authors (24,25,28,33), the published frequency being 8-12%. This fact is most likely influenced by the higher frequency of associated gestational pathology that precipitates in some cases and determines the end of pregnancy in others. This is the main cause of the higher frequency of medical inductions of labor and elective caesarean sections observed in this group of women.

We have found a clear increase in the rate of caesarean sections in elderly patients (53% vs.39%), as reflected in most of the publications. This increase occurs in both elective and emergency cesarean sections (35,41–43). Some authors explain this fact by the greater increase in fetal malpositions, as well as the slow evolution of labor(42,43). In our study, we did not find significant differences regarding the indication for caesarean section between the two groups.

In the present study , older maternal age was associated with adverse neonatal outcomes such as low birth weight, lower Apgar score at 1st and 5th minutes, admission to NICU and neonatal mortality,($P<0.05$). Also respiratory distress and congenital anomalies were more frequent in older women group than controls , but the difference did not reach the statistical significance, ($P>0.05$), similar findings also concluded by other authors with some variation in the incidence rates of these outcomes (22,31,32,34,35).

In general, the overall adverse maternal and neonatal outcomes were significantly associated with advanced maternal age. Therefore, we conducted a further analysis using binary regression and found that maternal age ≥ 35 and BMI ≥ 25 (overweight/obese) were the main risk factors for adverse pregnancy outcomes. We did not found significant correlation with other variables.

Conclusions:

Based on our results, we can conclude that advanced maternal age (≥ 35 years) is associated in our environment with more gestational disorders, a higher rate of medical induction of labor and caesarean sections, especially in primiparous women. Older maternal age and larger body mass index were the main risk factors for adverse pregnancy outcomes. Hence, all this has repercussions on maternal and fetal morbidity and mortality, making them a population group at obstetric risk that requires adequate prenatal care, which transcends the field of health planning, given the percentage of elderly pregnant women in our community.

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