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FETOMATERNAL OUTCOME IN ELDERLY PREGNANCY: A PROSPECTIVE COHORT STUDY

RESULTADO FETOMATERNO EN EMBARAZOS DE EDAD AVANZADA: UN ESTUDIO DE COHORTE PROSPECTIVO

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ABSTRACT

Objective: To assess fetomaternal outcome in elderly pregnancy. **Material and Methods:** This was a prospective cohort study involving 102 pregnant women> 32 weeks of gestation, with 51 participants in each of the two groups: one group of women aged ≥35 years (case group) and another group of women aged <35 years (control group). **Results:** In the case group, 28 participants (54.9%) developed pregnancy-induced hypertension, compared to only 7 participants (13.7%) in the control group (p=0.001). Gestational diabetes mellitus was observed in 12 participants (23.5%) in the case group, while only 1 participant (2.0%) in the control group was affected (p=0.001). The mean gestational period in the case group was 37.04 ± 1.95 weeks, whereas the control group had a mean gestational period of 38.82 ± 1.67 weeks (p=0.001). Additionally, 34 participants (66.7%) in the case group underwent a lower segment caesarean section (LSCS), compared to 13 participants (25.5%) in the control group (p=0.001). There was an increase in the incidence of adverse perinatal outcomes in the case group, including preterm deliveries, low birth weight, and Neonatal Intensive Care Unit admissions. **Conclusions:** The study concludes that fetomaternal morbidity and the need for operative interventions increase with advancing maternal age.

Key words: Maternal age, Caesarean section, Pregnancy (Fuente: MeSH, NLM)

RESUMEN

Objetivo: Evaluar el resultado fetomaterno en el embarazo en edad avanzada. **Material y métodos:** Estudio de cohorte prospectivo que incluyó a 102 mujeres embarazadas de más de 32 semanas de gestación, con 51 participantes en cada uno de los dos grupos: un grupo de mujeres de ≥35 años (grupo de casos) y otro grupo de mujeres de <35 años (grupo de control). **Resultados:** En el grupo de casos, 28 participantes (54,9%) desarrollaron hipertensión inducida por el embarazo, en comparación con solo 7 participantes (13,7%) en el grupo de control (p=0,001). Se observó diabetes mellitus gestacional en 12 participantes (23,5%) en el grupo de casos, mientras que solo 1 participante (2,0%) en el grupo de control se vio afectada (p = 0,001). El período gestacional medio en el grupo de casos fue de 37,04 ± 1,95 semanas, mientras que el grupo de control tuvo un período gestacional medio de 38,82 ± 1,67 semanas (p=0,001). Además, 34 participantes (66,7%) del grupo de casos se sometieron a una cesárea de segmento inferior (LSCS), en comparación con 13 participantes (25,5%) del grupo de control (p=0,001). Hubo un aumento en la incidencia de resultados perinatales adversos en el grupo de casos, incluidos partos prematuros, bajo peso al nacer e ingresos a la Unidad de Cuidados Intensivos Neonatales. **Conclusiones:** La morbilidad fetomaterna y la necesidad de intervenciones quirúrgicas aumentan con el avance de la edad materna.

Palabras clave: Edad materna, Cesárea, Emabrazo (Fuente: DeCS, BIREME)

INTRODUCTION

Pregnancy and childbirth are normal physiological phenomenon. One such risk factor is elderly pregnancy which leads to maternal and fetal complication. Council of International Federation of Gynecology and Obstetrics defined the age of Elderly Pregnancy as “any pregnancy in women who is ≥ 35 years of age at the time the baby is born” (1)

Increasing maternal age has been a worldwide trend. In recent decades, pregnancies at advanced maternal ages have become increasingly common in both developed and developing countries. In developed countries & among high socioeconomic groups the trend of having children later in life can be attributed to several factors. These include changes in family structures with more late marriages or remarriages, women's pursuit of higher education, career advancement, and improvements in assisted reproductive techniques and the availability of effective and safe contraceptives (2). However, in developing countries, the situation is different for low socioeconomic groups. Women in these groups tend to become pregnant at an advanced age due to the desire for a larger family size, sometimes a preference for male children, and a lack of knowledge about the availability of effective contraception (3).

Advanced maternal age is typically defined as being 35 years or older at the time of delivery, while very advanced maternal age is considered 40 years or older. Fertility decreases with age, and women who conceive later in life face a higher risk of pregnancy complications. These increased risks seem to be independent of other health conditions. Women of advanced maternal age with chronic conditions such as hypertension, diabetes, or poor overall health are at an even greater risk for adverse pregnancy outcomes compared to their younger counterparts (4). The maternal mortality rate is 2.5 times higher in women aged 35–39 years and 5.3 times higher in women aged 40 years or above (5).

According to many studies, advanced maternal age is often associated with several obstetrical complications (gestational diabetes, hypertension, pre-eclampsia) and fetal complications (growth retardation, prematurity, fetal malformation) (6-8). Current evidence indicates a strong link between advanced maternal age and increased risks of miscarriage, chromosomal abnormalities, spontaneous abortion, ectopic pregnancy, preterm delivery, prolonged labor, low birth weight, intrauterine fetal death, pregnancy-induced hypertension, gestational diabetes, and delivery by caesarean section (9).

Incidence of elderly pregnancy has significantly increased, especially in higher socioeconomic strata, well-educated and working-class women. The aim of the study was to assess fetomaternal outcome in elderly pregnancy.

MATERIAL AND METHODS

This prospective cohort study was carried out after obtaining approval from the institutional ethics committee, as indicated by the reference number IEC-DDUH/upn117/2022-05-12/47/v1. Pregnant women > 32 weeks of gestation were included in the study. Pregnancy conceived by assisted reproductive techniques and Pregnant women with surrogacy were excluded from the study.

Sample size determination was based on a prior study by Dixit PV et al., (9) with considerations for a 95% confidence level and 90% power, taking maternal outcome as development of PIH in 30% of elderly gravida women and development of PIH in in 5% controls, resulting in a proposed sample size of 51 participants per group (total = 102).

Informed consent was taken from all the pregnant women willing to participate and fulfilling the inclusion and exclusion criteria before recruiting them in the study. 102 pregnant women were divided into two groups (Case group and Control group). Pregnant woman of ≥35 years of age (Cases group) and Pregnant woman of <35 years of age (Control group) with >32 weeks of period of gestation coming to ANC clinic or in labor were included in the study and they were followed till 48 hours after delivery. Detailed history includes menstrual history, obstetric history, past medical history, family history, personal history, social history and education history was taken. General physical examination was done. Temperature, pulse rate, blood pressure, weight, height, pallor, edema, icterus, respiratory rate was recorded. Systemic examinations including per abdominal examination

and per vaginal examination were done. Routine investigations- Blood grouping and Rhesus typing, Hemoglobin, viral markers, Glucose challenge test, thyroid function test, urine examination, ultrasound for fetal wellbeing was done. Patients were followed up throughout the pregnancy and fetomaternal outcomes were compared between pregnant women of age ≥ 35 years and age <35 years.

Maternal outcomes were assessed by the following parameters: number of patients developing complications like pregnancy induced hypertension, gestational diabetes mellitus, antepartum hemorrhage, number of patients requiring cesarean section and number of patients requiring instrumental delivery. Fetal outcomes were assessed by the following parameters: number of babies born with birth weight <2.5 kg, number of babies born with gross congenital anomalies and still birth number of babies requiring neonatal intensive care unit admission.

In statistical analysis, the collected data was entered in Microsoft Excel, analyzed and statistically evaluated using SPSS-25 version. Normality of each variable was assessed by using the Kolmogorov-Smirnov test. Quantitative data was expressed by mean, standard deviation or median with interquartile range and depends on normal distribution, difference between two means was tested by student t test or Mann Whitney U test.

Qualitative data was expressed in percentage and difference between the proportions was tested by chi square test or Fisher's exact test. 'P' value less than 0.05 was considered statistically significant.

RESULTS

A total of 102 women were enrolled in the study. The mean (SD) age of participants was 36.94±2.23 years in the case group and 24.74±3.14 years in the control group. The p-value for the difference in age distribution between the groups was statistically significant (p=0.001).

The distribution of study participants by gravidity, primi gravida (9.8%, 45.1%), multi-gravida (90.2%, 54.9%) in case and control group respectively with p value 0.001. The education status of study participants. Illiterate individuals had a higher representation among cases (35.3%) compared to controls (7.8%). Participants with education up to 12th grade were more prevalent among control (56.9%) than case (39.2%). The p-value for the difference in education distribution between the groups was statistically significant (p=0.009). The socioeconomic status of the study participant. Majority of the study population were from Middle socio-economic status (43.1%) followed by lower socio-economic group (35.3%) The p-value for the difference in education distribution between the groups was statistically not significant (p=0.360). (**Table 1**)

Table 1. Distribution of study participants according to gravidity, education and socioeconomic status among case and control group

	Case (n=51)		Control (n=51)		p-value
	n	%	n	%	
Gravida	5	9.8%	23	45.1%	
Primigravida	5	9.8%	23	45.1%	0.001
Multigravida	46	90.2%	28	54.9%	
Total	51	100.0%	51	100.0%	
Education					
Illiterate	18	35.3%	4	7.8%	
Upto 8th	7	13.7%	8	15.7%	
Upto 12th	20	39.2%	29	56.9%	0.009
Graduate and above	6	11.8%	10	19.6%	
Total	51	100.0%	51	100.0%	
Socioeconomic status					
Lower	18	35.3%	11	21.6%	
Lower middle	9	17.6%	15	29.4%	
Middle	22	43.1%	23	45.1%	0.360
Upper	2	3.9%	2	3.9%	
Total	**51**	**100.0%**	**51**	**100.0%**	

Table 2. Comparison of antenatal complications, mode of delivery and gestation age between case and control group

	Case (n=51)		Control (n=51)		p-value
	n	%	n	%	
Antenatal complications					
Pregnancy-Induced Hypertension	28	54.9%	7	13.7%	0.001
Chronic Hypertension	4	7.8%	0	0.0%	0.041
Gestational Diabetes Mellitus	12	23.5%	1	2.0%	0.001
Diabetes Mellitus	3	5.9%	0	0.0%	0.079
Antepartum Haemorrhage	0	0.0%	1	2.0%	0.315
Anaemia	2	3.9%	1	2.0%	0.558
Oligohydramnios	2	3.9%	2	3.9%	1.000
Mode of delivery					
Lower segment caesarean section	34	66.7%	13	25.5%	
Normal vaginal delivery	17	33.33%	38	74.5%	0.001
Instrumental delivery	0	0	0	0	
Gestation age					
Preterm (<37 week)	15	29.4%	2	3.9%	
Term (37-40 week)	35	68.6%	47	92.2%	0.002
Post term (>40 week)	1	2.0%	2	3.9%	

Compares the incidence of various antenatal complications between the case and control groups. In the case group, 28 participants (54.9%) had Pregnancy-Induced Hypertension (PIH) compared to 7 participants (13.7%) in the Control group (p=0.001). Gestational Diabetes Mellitus (GDM) which was 12 (23.5%) in the case group and 1(2.0%) in the control group (p=0.001). The comparison of the mode of delivery between the case and control groups. In the case group, majority of participants 34 (66.7%) had a Lower Segment Caesarean Section (LSCS) while control group had 13(25.5%), while none of the group participants underwent instrumental delivery. The p-value for the difference in the mode of delivery between the groups was statistically significant. The p-value for the difference in gestational period between the case and control groups was 0.001, indicating a statistically significant difference in gestational periods between the groups. The case group had a mean (SD) gestational period of 37.04 ± 1.95 weeks, while the control group had a mean (SD) gestational period of 38.82 ± 1.67 weeks (p = 0.001). The control group had a higher percentage of term births (92.2%) compared to the case group (68.6%), while the case group had a considerably higher proportion of preterm births (29.4%) compared to the control (3.9%), with a statistically significant difference (p=0.002). (**Table 2**)

Compares the fetal outcomes between the case and control groups. In the Case group, 1 case of Stillbirth (2.0%), 21 cases of NICU (Neonatal Intensive Care Unit) admission (41.2%). In contrast, the Control group had 1 case of gross congenital anomaly (2.0%), 14 cases of NICU admission (27.5%). There were no significant differences between the groups in terms of Gross congenital anomaly (p=0.315), Stillbirth (p=0.315), NICU admission (p=0.144). The case group had a mean (SD) birth weight of 2.62 ± 0.50 kg, while the control group had a mean (SD) birth weight of 2.65 ± 0.45 kg. The p-value for the difference in birth weight between the two groups was 0.760, indicating that there is no statistically significant difference in birth weights between the case and control groups. The distribution of birth weight categories between the case group and the control group. The case group had a significantly higher proportion of neonates with lower birth weights, while the control group predominantly consisted of infants with birth weights of 2.5 kg or more. The p-value of 0.001 confirms this difference as statistically significant. (**Table 3**)

Table 3. Comparison of fetal outcome between case and control group

	Case (n=51)		Control (n=51)		p-value
	n	%	n	%	
Fetal outcome					
Gross congenital anomaly	0	0.0%	1	2.0%	0.315
Still birth	1	2.0%	0	0.0%	0.315
NICU admission	21	41.2%	14	27.5%	0.144
Birth weight					
<1.5 kg	1	1.9%	0	0%	
1.5 - <2.5 kg	23	45.2%	13	25.5%	0.001
>/= 2.5 kg	27	52.9%	38	74.5%	

NCIU: Neonatal Intensive Care Unit

DISCUSSION

In this study, the case group had a mean (SD) age of 36.94 ± 2.23 years, while the control group had a mean (SD) age of 24.74 0.50 ± 3.14 years (p=0.001). Similar findings were reported in other studies, with Manzoor S et al. (10) and Deeksha DM et al. (11) observing mean ages of 36.7 ± 2.78 years and 39.07 ± 2.08 years, respectively.

In this study, it was found that in the case group, 5 participants (9.8%) were primi-gravida, and 46 participants (90.2%) were multi-gravida. In the control group, 23 participants (45.1%) were primi-gravida, and 28 participants (54.9%) were multi-gravida (p=0.001). A similar trend was observed in a study by Dixit PV et al., where 15 participants (25%) in the study group were primi-gravida, and 45 participants (75%) were multi-gravida, compared to the control group, where 28 participants (46.7%) were primi-gravida, and 32 participants (53.3%) were multi-gravida, with a p-value of <0.013 (9). Additionally, a study by Abu-Heija AT et al., also found a similar pattern, with significantly higher parity associated with advancing maternal age (p = 0.001) (12).

In this study, it was observed that 18 participants (35.3%) in the case group were illiterate, compared to 4 participants (7.8%) in the control group (p=0.009). A similar pattern was found in a study by Ruba N et al., where 41 participants (32.8%) were illiterate, 45 (36%) had primary education, 30 (24%) had secondary education, and 9 (7.2%) had graduate or higher education (13).

In the present study, it was found that 28 participants (54.9%) in the case group had pregnancy-induced hypertension (PIH), while only 7 participants (13.7%) in the control group were affected (p=0.001). Similar findings were reported in studies by Dixit PV et al., Marai W et al., and Manzoor S et al., who also observed an increased incidence of hypertensive disorders in elderly gravidae, with rates of 29.6%, 17.7%, and 38.6%, respectively (9, 14, 10).

In this study, Gestational Diabetes Mellitus (GDM) was observed in 12 participants (23.5%) in the case group and 1 participant (2.0%) in the control group (p=0.001). Diabetes Mellitus (DM) was reported in 3 participants (5.9%) in the case group, while no participants in the control group had DM (p = 0.079). Similar findings were reported in other studies by Dixit PV et al., Marai W et al., and Manzoor S et al., who observed an increased incidence of GDM, with rates of 10%, 11.11%, and 10.5%, respectively (9, 14, 10). Additionally, the study by Dixit PV et al. reported an incidence of Diabetes Mellitus of 6.6% (19).

In the present study, the incidence rate of Antepartum Haemorrhage (APH) was found to be 0%. However, the incidence of APH varies significantly across different studies. For instance, in the study by Marai W et al., the incidence was reported to be 3.3% (14), while Manjoor S et al. observed a much higher incidence of 21.1% (10). These differences in incidence rates may be attributed to factors such as variations in study populations, healthcare settings, and diagnostic criteria used across the studies.

In the present study, the incidence of anemia was found to be 3.9%. However, the prevalence of anemia during pregnancy varies widely across different studies, reflecting various contributing factors. For example, in the study by Marai W et al., the incidence of anemia was reported to be 22.2% (14). This substantial difference in anemia rates between the two studies could be attributed to several factors, including differences in population demographics, nutritional status, socioeconomic conditions, access to antenatal care, and healthcare services.

In the present study, it was found that the control group had a higher percentage of term births (92.2%) compared to the case group (68.6%), while the case group had a significantly higher proportion of preterm births (29.4%) compared to the control group (3.9%) (p=0.002). Additionally, the case group had a mean (SD) gestational period of 37.04 ± 1.95 weeks, while the control group had a mean (SD) gestational period of 38.82 ± 1.67 weeks (p = 0.001). Similar trends were observed in the study by Dixit PV et al., where the mean gestational age for the study group was 37.0 ± 3.30 weeks, compared to 38.0 ± 2.50 weeks in the control group (9).

In the present study, 34 participants (66.7%) in the case group underwent a lower segment caesarean section (LSCS), while in the control group, 13 participants (25.5%) had LSCS (p=0.001). Other studies have reported similar findings. Manzoor et al. found that advanced-age mothers in Group II had a significantly higher caesarean cection (CS) rate of 64.3%, compared to 46.3% in the younger age Group I, with a p-value of 0.042 (10). Similarly, Rosa Rendtorff et al. observed that CS was the most common mode of delivery in older mothers, with an incidence of 59%, compared to 29% in younger mothers, with a p-value of < 0.001 (15). Furthermore, a study by Ruba N et al. found that 52% of elderly primi-gravida had CS, compared to just 12% in younger primi-gravida (13).

In the present study, the case group had a mean (SD) birth weight of 2.62 ± 0.50 kg, while the control group had a mean (SD) birth weight of 2.65 ± 0.45 kg (P=0.760). A similar finding was observed in the study conducted by Deeksha DM et al., where the mean birth weight of babies born to women aged >35 years was 2.624 kg, compared to 2.805 kg in women aged <35 years. The p-value for this difference was 0.343, which was not statistically significant (11). Additionally, in the study by Dixit PV et al., lower birth weight was more common in the study group, although the difference was not statistically significant (p = 0.089). The mean birth weight for the study group was 2.5 ± 0.712 kg, while for the control group, it was 2.7 ± 0.55 kg (9).

In the current study, it was found that in the case group, 23 neonates (45.2%) weighed between 1.5 kg and < 2.5 kg, compared to 13 neonates (25.5%) in the control group in the same weight range (p=0.001). The case group has a higher proportion of infants with lower birth weight. In a study by Dixit PV et al., a higher proportion of lower birth weight babies (23%) was observed in the elderly gravida group compared to the control group (9%), although the difference was not statistically significant (p = 0.089) (9). Similarly, the study by Manzoor S et al. found a significant increase in the incidence of low-birth-weight babies in the advanced age group (>35 years) at 26.2%, compared to 13.2% in the younger age group (22–35 years), with a statistically significant p-value of 0.047 (10).

In the current study, the case group had no cases of gross congenital anomalies, 1 case of stillbirth (2.0%), and 21 cases of NICU (Neonatal Intensive Care Unit) admission (41.2%). In contrast, the control group had 1 case of gross congenital anomaly (2.0%), no stillbirths, and 14 cases of NICU admission (27.5%). There were no significant differences between the case and control groups in terms of gross congenital anomalies (p = 0.315), stillbirth (p = 0.315), or NICU admission (p = 0.144). In the study by Manzoor S et al., 7.1% of babies in the case group and 5.1% in the control group were admitted to the NICU, with a p-value of 0.623, which was not statistically significant (10). Similarly, the study by Marai W et al. reported NICU admissions in 12% of the case group and 4.4% of the control group, with a p-value of 0.329, which was also statistically not significant (14).

Our study has certain limitations first the sample size was small. The study has been done in a single centre. The study was carried out in a tertiary care hospital, so hospital bias cannot be ruled out.

CONCLUSION

Elderly pregnancy is an independent risk factor for adverse pregnancy outcomes. The present study concluded that with advancing maternal age, there was an increased risk of antenatal complications such as pregnancy-induced hypertension and gestational diabetes mellitus. The study also found a higher incidence of comorbid conditions, including hypertension and overt diabetes mellitus, in older pregnant women. Notably, the study highlighted that antenatal complications in elderly gravidae were associated with a higher incidence of early pregnancy termination and an increased need for caesarean section. Additionally, elderly gravida was found to have a higher incidence of low-birth-weight babies and a relatively higher rate of NICU admissions.

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Contributions:

All authors: Conceptualization, data quality, statistical analysis, writing the project, methodological advice, project administration, search for resources, supervision, validation, writing the draft, writing the final version, reviewing the final version.