Original Article

The Influence Of Advanced Maternal Age On Women With Preeclampsia / Comparative Analyses At Tertiary Care Hospital

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Abstract

Background: Preeclampsia is a serious problem that leads to many deaths of both mothers and babies all over the world, particularly in developing countries. This condition specially related to pregnancy. Preeclampsia is caused by a number of factors, including problems with the placenta, imbalances in the body's natural processes, and damage to blood vessels.

Objective: To compare both perinatal and maternal outcomes among preeclampsia patients with advanced maternal age (AMA) and those with normal reproductive age group (RA).

Study design: Analytical cross-sectional study.

Place and Duration: This study was conducted at Hayatabad Medical Complex/Medical and Teaching Institute Peshawar KPK from Jan 2020 to Dec 2022.

Methodology: Overall, a total of 120 women were enrolled in this research. All of the women involved in this research were diagnosed with preeclampsia. The data for all participants was collected from the medical records of the women that were enrolled in this research. All of the 120 women were divided into two groups according to their maternal ages. One group contained women with maternal age 35 years or above. This group was called Advanced Maternal Age (AMA). The other group contained women with normal reproductive age which is from 20 years to 34 years of age.

Results: There were 35 women in the advanced maternal age group and 85 women in the normal reproductive age group. The poor perinatal and maternal outcomes were more in the advanced age group. Females in the advanced maternal age group had a higher incidence of C-sections, postpartum hemorrhage, pulmonary edema, visual impairment, birth asphyxia and intrauterine growth restriction.

Conclusion: In conclusion, poor perinatal and maternal outcomes are caused by advanced maternal age in pregnant women presenting with preeclampsia.

Keywords: preeclampsia, pregnant women, maternal age, maternal outcomes, perinatal outcome

Introduction

Preeclampsia is a serious problem that leads to morbidity and mortality of both mothers and babies all over the world, particularly in developing countries [1].Preeclampsia is a multisystem progressive disorder characterized by new onset

of hypertension and proteinuria or the new onset of hypertension plus significant end organ dysfunction with or without proteinuria typically presenting after 20 weeks of gestation or postpartum .

In Indonesia, the number of cases of preeclampsia has risen sharply over the past three years [2]. This problem takes place during pregnancy. This condition is caused by a number of factors, including problems with the placenta, imbalances in the body's natural processes, and damage to blood vessels [3, 4]. Symptoms of preeclampsia include high blood pressure and other signs of maternal morbidity and fetal distress, which can appear after 20 weeks of pregnancy [5]. While researchers are still trying to understand the exact cause of preeclampsia, there are many factors that can increase the risk of developing this condition.

Maternal age is a potential risk factor for preeclampsia. Women who are 35 years or older (referred to as "Advanced Maternal Age" or AMA) are found to be 4.5 times more exposed to the occurrence of preeclampsia when compared to those women who are aged between 25 years to 34 years [6]. A number of prior research studies have also found that the risk of concurrence of preeclampsia is more in women who are aged 35 years or older rather than those women who are in their normal reproductive age [7,8]. Women over 45 years old have a 1.86- and 2.03-times higher risk of preeclampsia and severe preeclampsia, respectively. It is now clear that preeclampsia is more common in advance maternal age, so in our study we are analyzing maternal and perinatal outcome in preeclampsia in advance maternal age group compared with normal reproductive age gp and poor maternal and perinatal outcome in preeclamptic patients with advance maternal age

AMA is also linked to poor perinatal outcomes in preeclampsia patients, such as less APGAR scores, more NICU admissions (Neonatal intensive care unit), preterm babies before thirty-seven weeks, C-section, and small for gestational age babies [9]. There are several possible explanations for the relationship between the age of mothers and the severe outcomes of pregnancy. The explanations include arterial stiffness, unhealthy lifestyle, impaired maternal hemodynamic adaptation, comorbid disease, and obesity [10]. The reason behind this research was to compare both perinatal and maternal outcomes between preeclampsia patients with AMA and those with normal reproductive ages (RA). A number of perinatal and maternal outcomes are evaluated in this research which include maternal deaths, postpartum hemorrhage, mode of delivery, and poor maternal outcomes. The complications attached to preeclampsia are also evaluated in this research. The complications are visual impairment, HELLP syndrome, eclampsia, and pulmonary edema. At least 1 maternal complication was needed to determine the existence of poor maternal outcomes. Those deaths that occurred during the pregnancy period or occurred within 42 days after their delivery because of any issue were called maternal mortality. Thrombocytopenia, elevated liver enzymes, and the occurrence of hemolysis were used to determine HELLP syndrome. The clinical symptoms were used to identify visual impairment and it was confirmed by an ophthalmologist. The detection of butterfly pattern on chest and the existence of severe respiratory distress was used to identify pulmonary edema. When the grand mal seizures occurred in the patients with preeclampsia, it was defined as eclampsia .We also include excess blood lose during vaginal or ceasarean delivery, as postpartum hemorrhage in maternal outcome

Maternal deaths, postpartum hemorrhage, mode of delivery, and poor maternal outcomes and the complications attached to preeclampsia are all maternal outcomes. Perinatal deaths, low birthweight, respiratory distress syndrome (RDS), small for gestational age (SGA), necrotizing enterocolitis (NEC), infection, prematurity, and Intraventricular Hemorrhage (IVH) were all perinatal outcomes. At least 1 or more complications had to be found after birth to identify it as poor perinatal outcomes.

Despite numerous studies investigating the effect of AMA on the results of pregnancy, there is a lack of evidence on how AMA affects a number of women who are diagnosed with preeclampsia [11]. There are a number of research studies that define the relationship between gestational hypertension and advanced maternal age, but not specifically with the diagnosis of preeclampsia [12]. There are also various studies that do not examine maternal outcomes. Rather than they have only focused on neonatal and perinatal consequences [13]. Hence, the reason behind this research was to compare both perinatal and maternal outcomes among preeclampsia patients with AMA and compare with normal reproductive ages (RA).

Methodology

Overall, a total of 120 women were enrolled in this research. All of the women involved in this research were diagnosed with preeclampsia. The data for all participants was collected from the medical records of the women that were enrolled in this research. Those women who were having singleton pregnancy,primi or multigravida were diagnosed with preeclampsia, with an age of 20 or above were included in this research. 3-year study from Jan 2020 to Dec 2022 at Hayat Abad Medical Complex/ Medical and Teaching Institute Peshawar KPK.

All of the 120 women were divided into two groups according to their ages. One group contained women with maternal age 35 years or above. This group was called Advanced Maternal Age (AMA). The other group contained women with normal reproductive age which is from 20 years to 34 years of age. The date of birth was used to determine the maternal age of the patients. The pregnancy outcomes of both groups were compared. Written consent of all patients was obtained and it was guaranteed that the name and code of the patients were kept confidential.

The criteria set by the ISSHP (International Society for the Study of Hypertension in Pregnancy) and the medical records of the patients were used to determine the presence of preeclampsia. Preeclampsia was defined as persistently elevated blood pressure after twenty weeks of gestation along with levels of creatinine equal to or more than 30 milligrams.

Results

There were total of 120 women enrolled in this research. All of the women were divided into 2 groups. One group contained women with maternal age 35 years or above. This group was called Advanced Maternal Age (AMA). The other group contained women with normal reproductive age which is from 20 years to 34 years of age. Table 1 shows the characteristics of the women enrolled in this research. Table 2 shows the maternal outcomes. Females in the advanced maternal age group had a higher incidence of C-section and poor maternal outcomes. Table number 3 shows the perinatal outcomes. Advanced maternal age group had a higher incidence of perinatal outcomes as compared to the RA group.

Table No. 1: characteristics of the women enrolled in this research.

Characteristics	**AMA group (n=35)**	**RA group (n=85)**
Type of preeclampsia		
• **Severe preeclampsia**	31(88.57 %)	78(91.76%)
• **Preeclampsia**	4 (11.42%)	7 (8.23%)
Prior chronic hypertension		
• **Yes**	14 (40%)	20 (23.52%)
• **No**	21 (60%)	65 (76.47%)
Diabetes gestational		
• **Yes**	5 (14.28%)	5 (5.88%)
• **No**	30 (85.71%)	80 (94.11%)
Hemoglobin levels (g/dL)		

• **<11**	10 (28.57%)	30 (35.29%)
• **11-13**	24 (68.57%)	48 (56.47%)
• **>13**	1 (2.85%)	7 (8.23%)
Onset of preeclampsia		
• **Early**	14 (40%)	28 (32.94%)
• **Late**	21 (60%)	57 (67.05%)
Parity		
• **Primipara**	4 (11.42%)	36 (42.35%)
• **Multipara**	31 (88.57%)	49 (57.64%)
Prior preeclampsia		
• **Yes**	9 (25.71%)	6 (7.05%)
• **No**	26 (74.28%)	79 (92.94%)
Employment		
• **Yes**	9 (25.71%)	26 (30.58%)
• **No**	26 (74.28%)	59 (69.41%)
BMI (kg/m2)		
• **<20**	2 (5.71%)	12 (14.11%)
• **20-30**	28 (80%)	59 (69.41%)
• **>30**	5 (14.28%)	14 (16.47%)

Table No. 2: Maternal outcomes

Maternal Outcomes	**AMA group (n=35)**	**RA group (n=85)**
HELLP syndrome		
• **Yes**	1(2.85 %)	4(4.70%)
• **No**	34(97.14%)	81(95.30%)
Eclampsia		
• **Yes**	1(2.85%)	2(22.35 %)

• **No**	34 (97.14%)	83 (97.64%)
Visual impairment		
• **Yes**	3(8.57%)	5(5.88%)
• **No**	32 (91.42%)	80 (94.11%)
Mode of delivery		
• **C-section**	19(54.28%)	30(35.29%)
• **Vaginal**	16(45.71%)	55(64.70 %)
Pulmonary edema		
• **Yes**	1(2.85%)	1(1.18%)
• **No**	34 (97.14%)	84 (98.82%)
PPH		
• **Yes**	7(20 %)	5(5.88%)
• **No**	28 (80%)	80 (94.11%)

Table No. 3: Perinatal outcomes

Perinatal outcomes	**AMA group (n=35)**	**RA group (n=85)**
Preterm delivery (<37 weeks)		
• **Yes**	9(25.71%)	59(69.41%)
• **No**	26 (74.28%)	26 (30.58%)
Asphyxia		
• **Yes**	21(60%)	24(28.24 %)
• **No**	14 (40%)	64 (75.29%)
Respiratory distress syndrome		
• **Yes**	3(8.57%)	5(5.88 %)
• **No**	32 (91.42%)	80 (94.11%)
Intrauterine growth restriction		
• **Yes**	5(14.29 %)	3(3.53 %)

• **No**	30 (85.71%)	82 (96.47%)
Infection		
• **Yes**	20(57.14%)	35(41.18%)
• **No**	15 (42.85%)	50 (58.82%)
Low birth weight		
• **Yes**	7(20%)	18(21.17 %)
• **No**	28 (80%)	67 (78.82%)

Discussion

The research findings suggest that advanced maternal age (AMA) is a significant contributing factor to adverse maternal consequences in cases of preeclampsia. Pregnant women with preeclampsia who also had AMA were found to have a greater likelihood of experiencing negative pregnancy results, requiring C-section delivery, and experiencing postpartum hemorrhage. However, the risk of the complications linked with preeclampsia such as pulmonary edema, HELLP syndrome, visual impairment, and eclampsia was not significant.

The risk of poor maternal outcome was found to be 3 times more in the advanced maternal age group as compared to the other normal reproductive age group. This is consistent with a previous study conducted in China that involved 2,800 singleton pregnancies and found a correlation between severe pregnancy outcomes and advanced maternal age. The more prevalence of obese women in the advanced maternal age group may contribute to these findings.

Obesity has been linked to adverse pregnancy outcomes, such as hypertension during pregnancy, gestational diabetes, miscarriage, small-for-gestational-age and cesarean section. However, the exact mechanisms underlying this association require further investigation. Additionally, another possible factor contributing to the severe pregnancy outcomes in the advanced maternal age group could be the type of preeclampsia experienced. The advanced maternal age group had a bigger proportion of early-onset preeclampsia instead of the other group with was of normal reproductive age, which has been shown in a large cohort study to increase the risk of maternal morbidity, including Hepatorenal, respiratory system, cardiovascular, other morbidities, and nervous system, compared to late-onset preeclampsia [14]. Another factor that could contribute to the severe maternal outcome is the higher number of chronic hypertension cases in the advanced maternal age group.

In this study risk of postpartum hemorrhage was 3.9 times more in the advanced maternal age group rather than the other group with normal reproductive ages. Although two other large studies examining the effects of AMA on pregnancy outcomes did not report on post-partum hemorrhage (PPH) rates, Khalil et al. did not find any significant difference in the rates of blood transfusion between both of the groups. Nevertheless, an indirect consequence of increased postpartum hemorrhage can be the need for blood transfusion. There may be another factor that could contribute to the increased risk of PPH, which is the increased occurrence of anemia in the advanced maternal age group. More factors that could contribute to the increased risk of PPH are higher ratio of obese women, and more parity in the advanced maternal age group. It is worth noting that all instances of postpartum hemorrhage in the advanced maternal age group occurred in females who had given birth multiple times. Our study also confirmed the findings of other large studies that advanced maternal age increases the risk of C-section delivery by more than two-fold. There was a research study conducted in the UK which found that females who had advanced maternal age were having more risk of C-section delivery [15]. According to Mylonas et al., the risk of C-section delivery is not linked to advanced age. Rather it is linked with comorbidities that develop in women with advanced maternal age [16]. It was also concluded in our research that the risk of poor perinatal outcomes was increased because of advanced maternal age. The group with advanced maternal age had a higher proportion of poor perinatal outcomes as compared

to the other group with normal reproductive ages. There are a number of factors that contribute to the higher risk of poor perinatal outcomes. These factors were a higher number of early-onset preeclampsia and obesity.
The advanced maternal age group had a less risk of preterm birth before thirty-seven weeks as compared to the other group. According to a Finnish research study, as the maternal age increases, the risk of preterm birth increases regardless of whether it is induced or it occurs spontaneously [17]. Some factors such as miscarriage risk, smoking, myometrial vascular damage, higher prevalence of comorbidities, overweight, and smoking, are the ones that contribute to the increased risk of preterm birth. Anyhow, there was a study by Shan et al. having the different results[18].

It was also concluded in our research that the advanced maternal age group had 4 times higher risk of intrauterine growth restriction (IUGR) as compared to the other group. Moreover, the risk of asphyxia was also 2 times more in the advanced maternal age group as compared to the other group which had normal reproductive ages. This is similar to Finnish research which shows that the occurrence of asphyxia was 2 times more in the advanced maternal age group [19]. The 2 times greater infection risk in the advanced maternal group compared to the other group may be attributable to the higher occurrence of preterm birth and asphyxia in the advanced maternal age group. Prematurity can result in an immature innate immune system, which raises the risk of infection, particularly in low birth weight babies [20]. No instances of perinatal death, NEC, or IVH were reported, but there was no significant difference in the frequency of preterm delivery, low birth weight, or respiratory distress syndrome in this study.

Conclusion

In conclusion, poor perinatal and maternal outcomes are caused by advanced maternal age in pregnant women with preeclampsia. According to this research, pregnant women with preeclampsia are at an increased risk of having poor maternal and perinatal outcomes due to advanced maternal age.

Conflict of interest

None

Funding source

None

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