

## Original Research Article

# A comparative study of pregnancy outcome among women with preeclampsia and normotensive at the Alex Ekwueme Federal University Teaching Hospital Abakaliki, Nigeria

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**Received:** 28 July 2019

**Accepted:** 05 September 2019

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### ABSTRACT

**Background:** Preeclampsia is a pregnancy specific multisystem disease and it is associated with increased maternal and perinatal morbidity and mortality. Any factor(s) which could reliably predict the likelihood of serious complications would be very valuable in predicting the associated adverse outcome. Objective of this study compare maternal and fetal outcomes of preeclamptic patients with normotensive control in Alex Ekwueme Federal University Teaching Hospital, Abakaliki, Nigeria.

**Method:** This was a 4-year retrospective case-control study of the pregnancy outcomes among preeclamptic and normotensive women managed in our facility between 1<sup>st</sup> January 2012 and 31<sup>st</sup> December 2015. Data analysis was done using Epi Info software 7.2.1.

**Results:** During the study period there were 6,585 deliveries among which 92 of the patients were managed for preeclampsia. This gives a prevalence of 1.4% or 14 per 1000 deliveries. There was no difference in the age and parity of the control. Most of the preeclamptic patients managed over the study period were unbooked for antenatal care in the facility (p value <0.0001). Preeclamptic patients were more likely to be delivered preterm (p value was <0.0001), and by caesarean section compared to the control. They were also more likely to have babies with low birth weights and poorer fetal outcomes. There was no difference in maternal mortality between both groups.

**Conclusion:** Preeclampsia is associated with the unbooked status and poorer perinatal outcome compared with normotensive women. There is need to encourage women to book for antenatal care for prompt identification and management of these women.

**Keywords:** Adverse, Abakaliki, Determinants, Outcome, Pregnancy, Pre-eclampsia

## INTRODUCTION

Preeclampsia is a pregnancy specific multisystem disease diagnosed by the characteristic appearance of gestational hypertension and significant proteinuria from the second

half of pregnancy in a previously normotensive and proteinuric woman.<sup>1</sup>

Globally, pre-eclampsia is said to complicate 2-10% of pregnancies.<sup>2</sup> Although the outcome is often good, pre-eclampsia often is associated with increased maternal and

perinatal morbidity and mortality.<sup>3</sup> Overall, 10%–15% of maternal deaths are directly associated with preeclampsia and eclampsia.<sup>4,5</sup> The prevalence reported in some hospital based studies in Nigeria ranged from 1.2-10%.<sup>5,7</sup>

The aetiology of preeclampsia is largely unknown and had been referred to as the “disease of theories”.<sup>8-10</sup> Central to its pathophysiology is the abnormal placentation, release of soluble factors from the ischaemic placenta into maternal plasma plays a central role in endothelial dysfunction which is the most prominent feature of this disease.<sup>11,12</sup> The disease can occur in the absence of fetal tissue and the clinical manifestations of the disease begin to resolve following delivery of the placenta.<sup>13,14</sup> It is more common in the first pregnancy, in women with previous history of preeclampsia, gestational diabetes, multiple gestation, connective tissue diseases, and extremes of maternal age.<sup>15</sup>

Management principles continuously balance the risks against the benefits of induced preterm delivery and maternal and fetal complications.<sup>16</sup> Mild preeclampsia may be managed on an outpatient basis. Antihypertensive may be commenced at systolic blood pressure of 150 mmHg.<sup>17</sup> Severe preeclampsia involves stabilization and delivery by the most expeditious route. Resuscitation and stabilization of patients with severe preeclampsia may involve administration of magnesium sulphate to prevent fits, anti-hypertensives to control blood pressure, restriction of fluid intake and delivery<sup>17</sup>

It is estimated that about 63,000 maternal deaths occur from hypertensive diseases in pregnancy each year with more than 98% of these deaths occurring in developing countries.<sup>18</sup> These maternal deaths often result from complications associated with pre-eclampsia such as eclampsia, HELLP syndrome; (Haemolysis, Elevated Liver enzymes and Low platelet) and pulmonary edema. Others include stroke, abruptio placentae and disseminated intravascular coagulopathy.<sup>19,20</sup> Adverse perinatal outcomes associated with this disorder of pregnancy include intrauterine growth restriction, preterm delivery, admission into newborn intensive unit, and perinatal deaths.<sup>21,22</sup> Hence intensive surveillance is often required for optimal maternal and perinatal outcome.<sup>23,24</sup> The rate of progression and the occurrence of catastrophic complications are often difficult to predict.<sup>25</sup> Various determinants have been proposed but findings have been inconsistent.<sup>26</sup> Any factor(s) which could reliably predict the likelihood of serious complications would be very valuable in predicting the morbidities associated with this pathology. No study has been done in Abakaliki, South East Nigeria to determine correlation between maternal demographic factors and adverse outcomes in preeclampsia. Such knowledge would enable clinicians to be more proactive in predicting outcomes of preeclampsia and hence improve maternal and fetal outcome of this pregnancy specific condition.

## METHODS

Alex Ekwueme Federal University Teaching Hospital (formerly known as Federal Teaching Hospital), Abakaliki was established in December 2011 following the merger of the defunct Federal medical centre and the then Ebonyi State University Teaching Hospital. The hospital has eleven clinical departments including Obstetrics and Gynaecology. The department of Obstetrics and Gynaecology of the hospital runs antenatal clinics managed by consultants and resident doctors with trained Nurses and Midwives. Antenatal clients are booked daily every weekday and are assigned consultants according to the units/teams running antenatal clinic each day. The department has five units (each divided into two subunits) each subunit is manned by at least two consultant staff. The department manages high risk pregnant women using standardized protocols. This hospital serves as a major referral center for Ebonyi, Benue and Cross River states. Patients are usually referred from general hospitals, government-owned health centers, private hospitals and from other department in the hospital.

This was a 4-year retrospective case-control study of patients managed for preeclampsia at the Obstetrics and Gynaecology Department and the normotensive women that delivered within the period. The case files of the cases and controls managed at the facility from 1<sup>st</sup> January 2012 to December 31<sup>st</sup> 2015 was retrieved from the Medical Records Department, Gynaecological Emergency, Labour Ward, Operation Theatre, and data extracted into a study proforma focusing on socio-demographic and obstetric characteristics including age, parity, occupational status, booking status, gestational age, type of preeclampsia/eclampsia, mode of delivery, maternal and fetal morbidities and mortalities.

### *Data analysis*

Data collection was done using a pre-designed proforma. Data analysis was done using Epi Info software (7.2.1 CDC Atlanta Georgia). The results were expressed as frequency tables, percentages, pie charts, mean and standard deviation. Associations between categorical data would be analyzed using  $\chi^2$ , with a p-value of 0.05 considered statistically significant.

### *Ethical consideration*

Ethical clearance was sought and obtained from the Health Research and Ethics committee of the Alex Ekwueme Federal University Teaching Hospital Abakaliki, Nigeria.

## RESULTS

During the study period there were 6585 deliveries among which 92 of the patients were managed for preeclampsia. This gives a prevalence of 1.4% or 14 per

1000 deliveries. These patients were considered as the cases while two subsequent normotensive deliveries that took place in the facility were considered as controls. Table 1 shows the demographic characteristics of the cases and controls. Most of the patients managed for preeclampsia were within the reproductive age group; this was similar to that of the control. There was no statistical difference in the ages of the cases compared

with those of the control. Although preeclampsia was commoner among nulliparous parturients the mean parity between both groups was not statistically significant. Most of the preeclamptic patients managed over the study period were unbooked for antenatal care in the facility and the difference between both groups was statistically significant with a p value <0.0001. Being employed or not was not a risk factor for developing preeclampsia.

**Table 1: Demographic characteristics of the cases and control.**

Parameters	Cases	Control	T value	X <sup>2</sup>	P value
<b>Age</b>					
<20	8	6			
20-34	76	155		0.18649	0.66585
≥35	8	23			
Mean age	28.22±5.76	29.21±4.59	2.396		0.123
<b>Parity</b>					
0	46	55			
1-4	35	97		0.12692	0.72163
≥5	11	32			
Mean parity	1.52±1.57	1.79±1.68	1.5479		0.1228
<b>Booking status</b>					
Booked	42	156			
Unbooked	50	28		46.1698	<0.0001
<b>Occupation</b>					
Employed	56	121			
Unemployed	36	63		0.63831	0.4243

**Table 2: Comparison of the fetal and maternal outcomes of the cases and control.**

Parameters	Cases	Control	T value	X <sup>2</sup>	p value
<b>Gestational age at delivery</b>					
<37	23	11			
37-41+6	64	166		15.1536	0.0001
≥42	5	7			
Mean GA	36.29±1.8	39.4±1.7	14.45		<0.0001
<b>Mode of delivery</b>					
C- section	45	44			
SVD	47	140		17.4934	0.00003
<b>Sex of baby</b>					
Female	39	75			
Male	53	109		0.06841	0.79366
<b>Baby's birth weight</b>					
<2.5	23	10			
2.5-3.9	68	162		7.65305	0.00567
≥4.0	1	12			
Mean BW	2.98±1.2	3.17±0.59	3.4866		0.0006
<b>Fetal outcome</b>					
Live birth	80	172			
Still birth	12	12		6.63148	0.01002
<b>Maternal mortality</b>					
No	90	183			
Yes	2	1		1.51659	0.21857

A comparison of the fetal and maternal outcomes of the cases and control showed that preeclamptic patients were more likely to be delivered preterm and were less likely to be delivered postdate (the  $p$  value  $<0.0001$ ) (Table 2).

An analysis of the mode of delivery showed that women who had preeclampsia were more likely to be delivered by caesarean section compared to the control. They were also more likely to have babies with low birth weight and poorer fetal outcomes. There was no difference in maternal mortality between both groups and fetal sex was also not different between both groups.

## DISCUSSION

The prevalence of preeclampsia in this study was 1.4% or 14 per 1000 deliveries; this was similar to 1.2% obtained in a similar study by Koofreh in Calabar (with similar patient characteristics). However, this value is less than the 6% reported in Sokoto and Kano in northern Nigeria; this difference had been adduced to early marriage and early childbirth practiced more in the northern part of Nigeria.<sup>23</sup>

Although nulliparity and advanced maternal ages have been described as risk factors for preeclampsia, this study did not demonstrate these findings. Adeosun et al did not also demonstrate these relationships in their findings.<sup>2,10-13,26</sup> Most of the women who were managed for preeclampsia were unbooked for antenatal care in the facility, and a comparison with the control group showed that being unbooked for antenatal care predisposes a woman to preeclampsia.

Ekine and co-workers in Bayelsa state had previously demonstrated that preeclampsia was commoner among unbooked patients who tend to have poorer maternal and neonatal outcomes.<sup>21</sup>

The relationship between the unbooked patient and preeclampsia may not be explained by this study but it is not unrelated to the fact that booking offers a woman the opportunity for blood pressure checks and routine urinalysis. Adeosun had determined that maternal occupation was not a risk factor preeclampsia and this finding was corroborated in this study which showed that maternal occupation does not predict risk for preeclampsia.<sup>26</sup>

Women with previous preeclampsia that required delivery at  $<34$  weeks' gestation are of particular concern because it is recognized that they are at greater risk of recurrent preeclampsia and worse fetal outcome.<sup>2,10,12</sup>

In this study the mean gestational age at delivery for the preeclamptic group was  $35.7 \pm 0.04$  which was significantly lower than the control group of  $38.4 \pm 0.2$  weeks ( $p < 0.001$ ). Preterm delivery and prematurity are the commonest causes of adverse neonatal outcome and may be inevitable especially when maternal clinical condition worsens.<sup>2</sup>

Compared to the control group preeclamptic patients are more likely to be delivered by caesarean section; rates: 45(81.4%), 24 (30%) for the study and control groups respectively ( $p < 0.00003$ ). This increased risk of caesarean delivery has been demonstrated in other studies.<sup>24,25</sup> The management principle is stabilization and delivery by the most expeditious route, which may involve cervical ripening (in patients with unfavorable cervix), induction of labor or caesarean section. The commonest indications for caesarean section were worsening maternal condition and fetal distress.

The mean birth weight of babies in the case group was significantly ( $p$  value = 0.005) lower compared with the controls. A further analysis of the birth weights showed that babies of preeclamptic patients were more likely to be born with low birth weights. The common cause of low birth weight is intra uterine growth restriction (IUGR) that may be precipitated by the preeclampsia and iatrogenic prematurity as was shown earlier, the preeclamptic woman is more likely to be delivered preterm compared to the control.<sup>24</sup>

The mean placental weight of the neonates of women managed for preeclampsia were statistically smaller when compared with those of the normotensive controls. This further corroborates the finding that preeclampsia causes IUGR as the placental weight is an indirect assessment of fetal wellbeing.

Preeclampsia is an important cause of maternal and perinatal morbidity and mortality. About 16% of the neonates of the preeclamptic patients had poor perinatal outcome in this study, and this was statistically significant compared to the normotensive control group. This adverse fetal outcome had been demonstrated in other studies. Hence there is need to balance the maternal and fetal risks in determining optimal time of delivery. There was no difference in maternal outcome in both groups. This may be as a result of improvement in method of managing preeclampsia especially with the introduction of magnesium sulphate and stricter fluid monitoring.

This study has several limitations. First, the patients were drawn from a single centre. A multicenter study is recommended to improve the external validity of the study. Secondly, the retrospective nature of the study limits its validity.

## CONCLUSION

The prevalence of pre-eclampsia in our environment is relatively low, however it is associated with poorer outcomes. It is associated with uncooked patients. Women who were managed for pre-eclampsia are more likely to be delivered pre-term and their babies were more likely to have low birth weight.

Although there was no difference in the maternal mortality, they were more likely to be delivered by caesarean section. They also have poorer perinatal outcome compared to normotensive control.

## ACKNOWLEDGEMENTS

The authors thank the staffs of Department of Medical Records for their assistance and cooperation during the study period.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee of the Alex Ekwueme Federal University Teaching Hospital, Abakaliki, Nigeria.*

## REFERENCES

- Uzan J, Carbonnel M, Piconne O, Asmar R, Ayoubi JM. Pre-eclampsia: Pathophysiology, Diagnosis, and Management. *Vasc Health Risk Manag.* 2011;7:467-74.
- Jido TA, Yakasai IA. Pre-eclampsia: A review of evidence. *Ann Afr Med.* 2013;12(2):75-85.
- Park JH, Chung D, Cho HY, Kim YH, Son GY, Park YW, et al. Random Urine Protein/Creatinine Ratio Readily Predicts Proteinuria in Preeclampsia. *Obstet Gynecol Sci.* 2013;56(1):8-14.
- Duley L. The global impact of pre-eclampsia and eclampsia. *Semin Perinatol.* 2009;33(3):130-7.
- Swati S, Ekele BA, Shehu CE, Nwobodo EI. Hypertensive disorders in pregnancy among pregnant women in a Nigerian Teaching Hospital. *Nig Med J.* 2014;55(5):384-8.
- Kooffreh ME, Ekott M, Ekpoudom DO. The prevalence of pre-eclampsia among pregnant women in the University of Calabar Teaching Hospital, Calabar. *Saudi J Health Sci.* 2014;3:133-6.
- Hernández-Díaz S, Toh S, Cnattingius S. Risk of pre-eclampsia in first and subsequent pregnancies: Prospective cohort study. *BMJ.* 2009;338:b2255.
- World Health Organization. Trends in Maternal Mortality: 1990 to 2008. 2010. Available at: <https://www.who.int/reproductivehealth/publication/monitoring/9789241500265/en/>. Accessed 14 August 2018.
- Chan P, Brown M, Simpson JM, Davis G. Proteinuria in Pre-eclampsia: How Much Matters? *BJOG: an Int J Obstet Gynaecol.* 2005;112:280-5.
- Waugh JJS, Smith MC. Hypertensive Disorders. In: Edmond DK (ed). *Dewhurst's Textbook of Obstetrics and Gynaecology.* 8<sup>th</sup> ed. John Wiley and Sons, Ltd. 2012: 101-10.
- Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, et al. Hypertensive Disorders. *Williams Obstetrics.* 24<sup>th</sup> ed. USA: McGraw-Hill companies; 2014:728-79.
- Mustapha R, Ahmed S, Gupta A, Venuto R. A Comprehensive Review of Hypertension in Pregnancy. *J Pregnancy.* 2012;10(5):91-109.
- Sabitha k, Gopal BV, Raj KG, Rafi MD, Sudhakar T, Ramadevi C et al. Preeclampsia: Its Effect on Renal, Cardiovascular, Hepatic and Thyroid Functions a Review. *Am J Clin Med Res.* 2014;2(6):111-3.
- The American College of Obstetricians and Gynecologists. *Diagnosis and Management of Preeclampsia and Eclampsia.* ACOG Practice Bulletin 33, 2002. Available at: [journals.lww.com/greenjournal/Fulltext/2002/01000/ACOG\\_Practice\\_Bulletin\\_No\\_33.aspx](http://journals.lww.com/greenjournal/Fulltext/2002/01000/ACOG_Practice_Bulletin_No_33.aspx): Accessed 13 August 2018.
- von Dadelszen P, Magee LA, Devarakonda RM, Hamilton T, Ainsworth LM, Yin R, et al. The prediction of adverse maternal outcomes in preeclampsia. *J Obstet Gynaecol Can.* 2004;26:871-9.
- Nevo O, Soleymanlou N, Wu Y. Increased expression of sFlt-1 in in-vivo and in-vitro models of human placental hypoxia is mediated by HIF-1. *Am J Physiol.* 2006; 291(4):1085-93.
- Levine RJ, Lam C, Qian C. Soluble endoglin and other circulating antiangiogenic factors in preeclampsia. *N Engl J Med.* 2006;355(10):992-1005
- Tranquilli AL, Brown MA, Zeeman GG, Dekker G, Sibai BM. The definition of severe and early-onset preeclampsia. Statements from the International Society for the Study of Hypertension in Pregnancy (ISSHP). *Int J women Cardiovascular Health.* 2013;3:44-7.
- National Collaborating Centre for Women's and Children's Health. Hypertension in pregnancy the management of hypertensive disorders during pregnancy. NICE Clinical Guideline August 2010. Available at <https://www.nice.org.uk/guidance/cg107>. Accessed 26 August 2018.
- Confidential Enquiry into Maternal and Child Health. Saving Mothers' Lives: Reviewing maternal deaths to make motherhood safer 2003–2005: The Seventh Report of the Confidential Enquiries into Maternal Deaths in the United Kingdom. Available at: <https://www.hqip.org.uk/resource/cmace-and-cemach-reports/>. Accessed 25 August 2018.
- Ekine AA, Jeremiah I, Harry TC, West OL. Factors influencing the prevalence of Preeclampsia-eclampsia in booked and unbooked patients: 3 years retrospective study in NDUTH, Okolobiri. *World J Med Med Sci.* 2015;3(1):1-14.
- Agwu UM, Ifebunandu N, Obuna AJ, Nworie EO, Nwopko SO, Umeora OUI. Prevalence of Medical Disorders in Pregnancy in Ebonyi State University Teaching Hospital. *J Basic Clin Reprod Sci.* 2013; 2(1):22-6.
- Abubakar A, Abdullahi RA, Jibril HZ, Dauda MN, Poopola MA. Maternal Ethnicity and Severity of Pre-eclampsia in Northern Nigeria. *Asian J Med Sci.* 2009;1(3):104-7.
- Ebeigbe PN, Aziken ME. Early onset pregnancy induced hypertension/eclampsia in Benin City. *Nig J clin pract,* 2010(13)4.
- Ugwu E, Dim CC, Okonkwo CD, Nwankwo TO. Maternal and perinatal outcome of severe preeclampsia in Enugu, Nigeria after introduction of

Magnesium sulfate. Niger J Clin Pract. 2011;14(4): 418-21.

26. Adeosun OG, Ayebatonyo CM, Adeoye OO, Jaye O. Maternal and neonatal outcome of pre-eclampsia in African black women, south west Nigeria. Greener J Med Sci. 2015;5(4):67-76.

**Cite this article as:** Obi CN, Obi VO, Nwafor JI, Onwe BI, Onuchukwu VU, Ugoji D-PC, et al. A comparative study of pregnancy outcome among women with preeclampsia and normotensive at the Alex Ekwueme Federal University Teaching Hospital Abakaliki, Nigeria. Int J Res Med Sci 2019;7:3789-94.