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Original Article

### The Characteristics and Outcomes of Women Admitted with Preeclampsia at JOOTRH: A Review of June 2021 to December 2021

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*Preeclampsia,  
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Neonatal Outcomes,  
Maternal Outcomes.*

Preeclampsia is a hypertensive disorder in pregnancy occurring after 20 weeks of gestation and characterised by elevated blood pressure, proteinuria and oedema. It is one of the feared complications in pregnancy and contributes to maternal and perinatal morbidity and mortality. However, in Kisumu County and western Kenya in general there is no recent publication on risk factors and prevalence of preeclampsia and its contribution to maternal and perinatal morbidity and mortality. The objective of this study was to determine the characteristics and outcomes of women admitted with preeclampsia at Jaramogi Oginga Odinga Teaching and Referral Hospital in Kisumu County in Western Kenya. The purposive sampling technique was used and women diagnosed with preeclampsia within the study period were included while those without preeclampsia were excluded. Data collection was by retrospective review of medical records where 80 files were reviewed. The records were obtained from files in the Hospital's records department. The collected data was analysed using descriptive statistics involving the calculation of means, frequencies and standard deviation. The analyzed data was then presented in pie charts, tables and bar graphs which aided in interpretation. Ethical approval for the study was obtained from the Jaramogi Oginga Odinga Teaching and Referral Hospital Ethics Review Committee (JOOTHERC). The finding revealed that the majority of the women 31.25% were below 24 years old. Secondly, primiparity and parity of 1 accounted for 55% of the subjects while 9% had a parity of more than 4 and 36% had a parity of 2 to 3. Third, 26% of the women had a history of chronic hypertension and 11% of the women had a history of diabetic mellitus. Fourth, 80% of the women had a singleton pregnancy. Fifth, 77% of the women had mild preeclampsia at the time of diagnosis. Sixth, 51% of women had no complications while for those who complicated, 24% developed severe preeclampsia, 16% progressed to eclampsia, 5 % went into acute renal failure, 3% had pulmonary oedema and 1% succumbed from preeclampsia complications. Seventh, perinatal outcomes were 16% had IUFD, 15% were delivered preterm and those with respiratory distress were at

13%. In conclusion, common risk factors of preeclampsia included age less than 24 years and primiparity. The majority of the women had mild preeclampsia at the time of diagnosis. The majority of the women had no complications while the common complications recorded were eclampsia and severe preeclampsia with a few developing acute renal failure, pulmonary edema and death. Intrauterine fetal death, preterm delivery and respiratory distress were the common neonatal complications. The study recommends that attention be focused on primigravidas in prenatal care and antenatally focusing on preeclampsia counselling and Blood pressure monitoring.

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## INTRODUCTION

The American College of Obstetrics and Gynecology (ACOG) defines preeclampsia as the presence of hypertension and proteinuria occurring after 20 weeks of gestation in a previously normotensive patient (Rana et al., 2019). Preeclampsia is known to affect about 2-10% of pregnant women worldwide (Wandabwa et al., 2010). The prevalence of preeclampsia in Kenya is estimated to range from 5.6% to 6.5% (Ndwigwa et al., 2020). It is a serious health problem worldwide that is responsible for maternal and neonatal morbidity and mortality (Yang et al., 2021).

The risk factors causing preeclampsia can be grouped as obstetric characteristics and maternal diseases. The risk factors of preeclampsia include

systemic illnesses such as obesity and chronic hypertension, a mother exposed to increased trophoblastic tissue as in molar pregnancy, genetic predisposition such as the family history of preeclampsia, antiphospholipid syndrome and pregestational diabetes mellitus (English et al., 2015). Other risk factors include advanced maternal age, teenage pregnancy, history of stillbirth, prior placental abruption, smoking and nulliparity (Rana et al., 2019).

In Kenya, the 2014 confidential inquiry into maternal death revealed hypertensive disorders in pregnancy (including preeclampsia) as the third leading cause of mortality, accounting for 20% of maternal deaths (Ministry of Health Kenya, Saving Mothers Lives 2017). Nearly 500,000 babies

worldwide lose their lives to preeclampsia and related hypertensive pregnancy disorders every year (Tsigas, E. Z. 2021). Complications of preeclampsia in babies include: preterm delivery, neonatal respiratory distress syndrome, cerebral palsy, necrotizing enterocolitis and retinopathy of prematurity (Backes et al. 2011). The absence of data in many countries is of concern and efforts need to be made to implement data collection and reporting for substantial characteristics (Abalos et al., 2013). In Kisumu County and western Kenya in general there is no recent publication on risk factors and prevalence of preeclampsia and its contribution to maternal and perinatal morbidity and mortality. This study evaluated the characteristics and outcomes of women admitted with preeclampsia at Jaramogi Oginga Odinga Teaching and Referral Hospital in Kisumu County, Kenya.

## METHODOLOGY

The study was conducted at Jaramogi Oginga Odinga Teaching and Referral Hospital in Kisumu County in western Kenya. It serves County, subcounty and private hospitals in more than 10 counties in the western Kenya region. A descriptive cross-sectional study design was used in this study. The study population comprised pregnant women admitted to Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH) with hypertension, proteinuria and oedema after 20 weeks gestation over the study duration. The sample size was 80 and the files were successively retrieved from the Hospital's record department. The sampling technique was purposive sampling method and all women meeting inclusion criteria were included in the study. The inclusion criteria included all women admitted with pre-eclampsia in JOOTRH within the study period while the women who did not have preeclampsia were excluded. A retrospective data collection method was used. This entailed reviewing medical records retrospectively to obtain

secondary data. A list with annual cases of preeclampsia was obtained from the records department in JOOTRH and then was used to extract files. A data extraction sheet was designed into which data was entered. Ethical approval for the study was obtained from the Jaramogi Oginga Odinga Teaching and Referral Hospital Ethics and Review Committee (JOOTRH-ERC). No personal identifiers such as names and areas of residence were entered into the data collection forms. The storage of these forms and the information on them was compliant with good clinical practice recommendations that require patient information to be kept confidential at all times. The forms were stored in a lockable storage area and destroyed upon completion of the study. Collected data was stored in a password-protected electronic database to which only the group, investigators and supervisors had access. A Microsoft Excel sheet tool was used as a data entry site. Microsoft Excel was used to generate descriptive data like frequencies, standard deviations and mean. The analyzed data was then presented in pie charts, tables and bar graphs which aided in interpretation.

## RESULTS

The results of this study include the obstetric characteristics of the women with preeclampsia at Jaramogi Oginga Odinga Teaching and Referral Hospital and the associated maternal and perinatal outcomes. The obstetric characteristics would include maternal age, parity, whether singleton or multiple pregnancy, blood pressure at the time of diagnosis and history of chronic illness.

## OBSTETRIC CHARACTERISTICS

### Maternal age

From this study majority of the women, 31.25% (n=25) were below 24 years.

**Table 1: Age group distribution**

AGE GROUP	NUMBER OF CASES	PERCENTAGE (%)
≤ 24	25	31.25
25-29	21	26.25
30-34	17	21.25
≥ 35	17	21.25

**Parity**

This study revealed that both the primiparous and those with a parity of 1 have a collective 55% percent chance of developing preeclampsia

**Table 2: Parity.**

PARITY	NUMBER OF CASES	PERCENTAGE (%)
Primigravidae	22	27.5
1	22	27.5
2-3	29	36
≥4	7	9

**Multiple pregnancies**

Most of the subjects in this study at 80% (n=64) had a singleton pregnancy while the minority of the cases 20% (n=16) had multiple pregnancies.

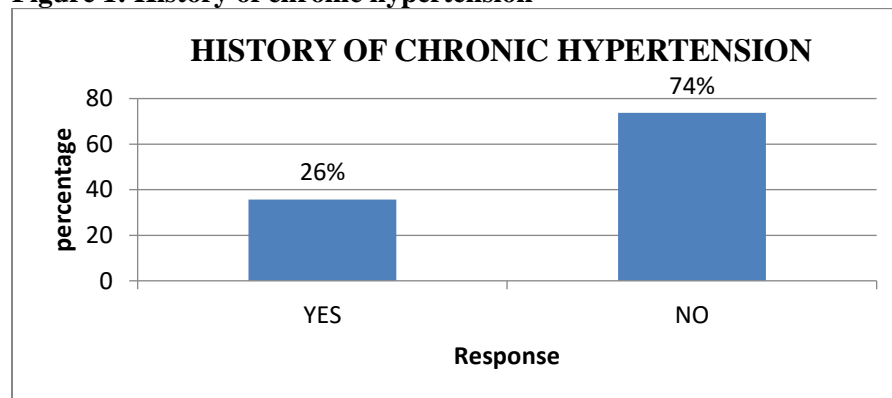
The study revealed that the majority of the women 77% (n=62) had their blood pressure between 140/90mmHg and 160/110mmHg at the time of diagnosis while 23% (n=18) were found to have a blood pressure of ≥160/110mmHg at time of diagnosis

**Women's Blood pressure measurement at the time of diagnosis****Table 3: Women's Blood pressure measurement at the time of diagnosis**

BLOOD PRESSURE	NUMBER OF CASES	PERCENTAGE (%)
140/90mmHg -160/110mmHg	62	77
≥160/110mmHg	18	23

**History of maternal diseases***History of chronic hypertension*

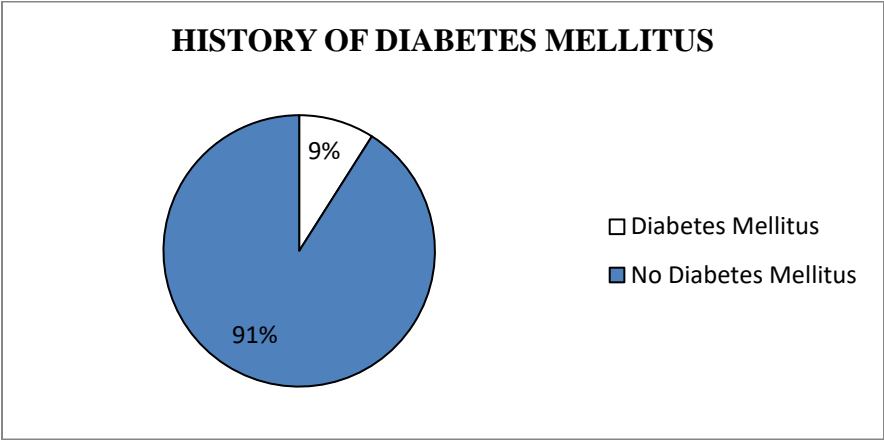
The study showed that the majority of the women, 74% (n=59) did not have a history of chronic hypertension while 26% (n=21) had a history of chronic hypertension.

**Figure 1: History of chronic hypertension**

*History of Diabetes Mellitus*

As illustrated in the figure below, 11% (n=9) of the respondents had a history of diabetic mellitus, while 89% (n=71) had no history of diabetic mellitus.

**Figure 2: History of Diabetes Mellitus**



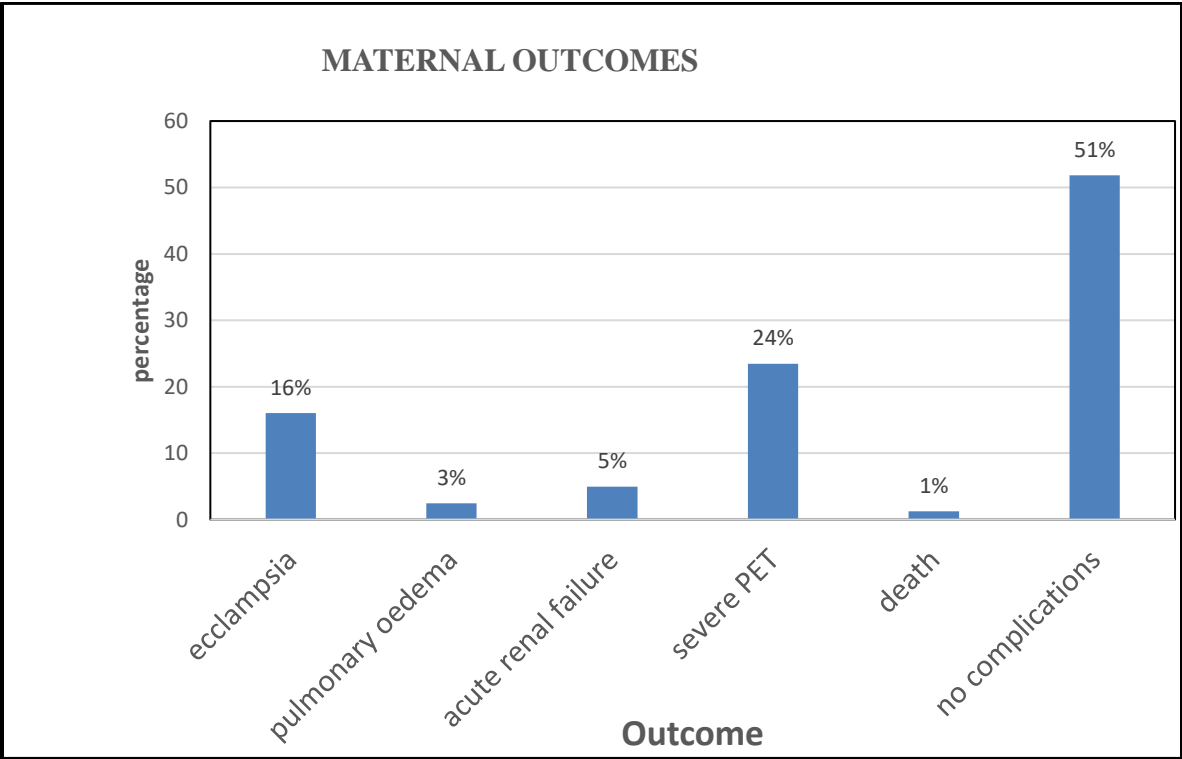
**MATERNAL AND PERINATAL OUTCOMES**

*Maternal outcomes*

The study found that in the majority of the cases, 51% (n=41) had no complications, 24% (n=19) progressed to severe preeclampsia, 16% (n=13)

developed eclampsia, 5% (n=4) went into acute renal failure, 3% (n=2) developed pulmonary oedema while 1% (n=1) succumbed from Preeclampsia complications. This is illustrated in the figure below.

**Figure 3: Maternal outcomes in preeclampsia**

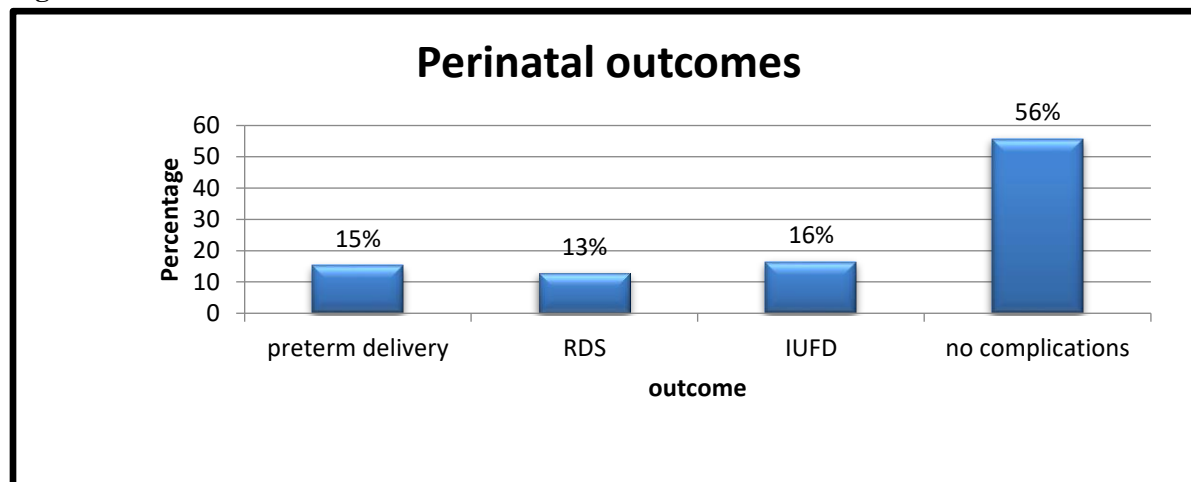


### Perinatal outcomes

Majority of the cases, 56% (n=45) had no complications, 16% (n=13) had intrauterine fetal

death, 15% (n=12) were delivered preterm and those with respiratory distress were at 13% (n=10). This is illustrated in the figure below.

**Figure 4: Perinatal outcomes**



### LIMITATIONS

The researchers had a challenge with file retrieval at the records department. We could not establish the gestational age at which the diagnosis of preeclampsia was made and thus could not establish an association between gestational age and the onset of preeclampsia.

### DISCUSSION

#### Maternal age

The study found that preeclampsia was more prevalent in women below 24 years (31.25%) compared to women with more than 35 years (21.25%). This study agrees with a previous study that showed preeclampsia is more common in women of young age (Benfateh et al., 2018). Younger women are mostly nulliparous and this could be the cause of increased risk of having preeclampsia. This can also be due to early pregnancies in this age group.

#### Parity

This study revealed that both the primiparous and those with a parity of 1 have a collective 55% percent chance of developing preeclampsia while

those of parity above 4 have a 9 %chance. These findings are in line with already documented literature and scientific findings that show increasing parity confers some degree of protection against developing preeclampsia. For instance, a study conducted in selected hospitals in Jakarta, Indonesia found that nulliparous women had 1.8 times the relative risk for developing preeclampsia (Opitasari et al 2014). A study in Thailand also revealed that nulliparity causes an increased risk of 3.8 for developing preeclampsia (Luealon et al, 2010). This could be due to the aetiology of preeclampsia in a woman's first pregnancy being attributed to immunological factors. (Amarel et al., 2015).

#### Multiple pregnancies

Findings from this study revealed that 80% had a singleton pregnancy while 20% had multiple pregnancies. It is documented in the literature that multiple pregnancies are a risk factor for the development of preeclampsia, with twin pregnancies carrying an incidence Rate of 2-3 times higher than singleton pregnancy (Bdolah et al 2008). The findings of this study are not in line with findings in past literature and can be explained by



the fact that most deliveries in Jaramogi Oginga Odinga teaching and referral hospital are of singleton rather than multiple pregnancies making it difficult to compare the relative risk in both pregnancies.

### **Women's Blood pressure measurement at the time of diagnosis**

This study's findings revealed that at the time of diagnosis, the blood pressure of 77% of the women was between 140/90 mmHg and 160/110 mmHg and 23% had a blood pressure of  $\geq 160/110$  mmHg. This indicates that the majority of the women had mild preeclampsia at the time of diagnosis while the minority had severe preeclampsia. Mild preeclampsia is diagnosed when blood pressure is 140 mmHg or higher systolic or 90 mmHg (English et al., 2015). Severe preeclampsia is diagnosed when blood pressure is 160 mmHg or higher systolic or 110 mmHg or higher diastolic (Rana et al., 2019). With the majority of the women having mild preeclampsia at the time of diagnosis, this provides an opportunity for close monitoring of the pregnancy to ensure a favourable maternal and neonatal outcome.

### **History of chronic hypertension**

This study found that 74% of the women didn't have a history of chronic hypertension while the remaining 26% had a history of chronic hypertension. These findings correlate with other studies around the world that showed up to 30% of women with chronic hypertension end up developing preeclampsia accompanied by new onset or worsening of preexisting proteinuria (Garovic & August 2013). With the majority of the women lacking a history of chronic hypertension, attention should be focused on all women regardless of their family history of chronic hypertension.

### **History of Diabetes Mellitus**

11% of the patients with preeclampsia had a positive history of preeclampsia, while 89% of the patients from the study did not have a history of diabetes.

Previous studies that were conducted and documented showed a positive correlation between positive history of diabetes mellitus and the development of preeclampsia. There is a relatively low rate of occurrence of preeclampsia in non-diabetic mothers and preeclampsia is found in 15-20 % of type 1 diabetic mothers and in 10-14% of type 2 diabetic mothers (Jensen et al 2004). From this study, 9% of the preeclamptic women had a positive history of diabetes and hence it supports the available documented findings that diabetes is a risk factor for preeclampsia.

### **Maternal outcomes**

The study revealed that the majority of the cases (51.9%) had no complications. For those who complicated, 23.5% developed severe preeclampsia, 16% progressed to developed eclampsia, 4.9 % went into acute renal failure, 2.5% had pulmonary oedema and death was recorded in 1.2%. These findings agree with a study that was carried out by the Instituto MaternoInfantil de Pernambuco (Amorim et al, 2001). This may be attributed to the WHO goal-oriented antenatal care package (Focused antenatal care) adopted in Kenya that focuses on early diagnosis and management of life-threatening conditions during pregnancy like preeclampsia.

### **Perinatal outcomes**

From the study, the majority of the cases (56%) had no perinatal complications. This is inconsistent with other studies that showed that the newborns of women with preeclampsia have approximately twice the risk of neonatal death, increased risk of low Apgar scores and neonatal intensive care admission (Paruk et al, 2000). Findings in our study could be attributed to improved and early interventions carried out in JOOTRH to prevent adverse neonatal outcomes in mothers with preeclampsia. In mild cases of preeclampsia, supportive management such as controlled blood pressures and administration of dexamethasone to promote lung maturity has enabled pregnancies to

progress to term and hence reduced cases of prematurity (15.2%). In cases of severe preeclampsia, early delivery done at gestation that offers fetal survival has led to a reduction in intrauterine fetal deaths.

## CONCLUSION

Based on our findings, common risk factors of preeclampsia included age less than 24 years and primiparity. The majority of the women at the time of diagnosis had mild preeclampsia. The majority of the women had no complications while the common complications recorded were eclampsia and severe preeclampsia with a few developing acute renal failure, pulmonary edema and death. Intrauterine fetal death, preterm delivery and respiratory distress were the common neonatal complications.

## RECOMMENDATIONS

- We recommend that healthcare providers focus their attention on the primigravidas in prenatal care and antenatally focusing on preeclampsia counselling and Blood pressure monitoring.
- A prospective study should be carried out which would aid in getting detailed data for our facility. The findings will be beneficial to healthcare providers, policymakers and other stakeholders to develop and adopt appropriate guidelines on preeclampsia prevention and management.

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