

Prevalence of pre-eclampsia among pregnant women attending Antenatal care at Hoima Regional Referral Hospital. A cross-sectional study.

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Abstract

Background:

This study focused on determining the prevalence of pre-eclampsia among pregnant women at Hoima Regional Referral Hospital.

Methodology:

A descriptive cross-sectional study was conducted at the Antenatal Care Unit of Hoima Regional Referral Hospital among 41 pregnant women aged 15-49 years, selected by convenience sampling. Data were collected using an administered structured questionnaire and analyzed using Microsoft Excel, with results presented as frequencies, percentages, tables, and charts.

Findings:

The prevalence of pre-eclampsia is 14.6% (6 out of 41 participants). Most of the participants, 18 out of 41(43.9%), were in the 25-34-year age bracket; 36.6% were between 15-24 years. Women aged 35-44 years accounted for 6 participants (14.6%); 2 participants (4.9%) were in the 45-49 years age category, while 32 out of 41(78.0%) were married, and 9(22.0%) were either single or divorced. Grossly, 12 participants (29.3%) reported a health worker diagnosis of elevated blood pressure, 10(24.4%) had confirmed proteinuria, and 7(17.1%) had been hospitalized due to hypertension in the current pregnancy. Findings thus suggest that pre-eclampsia constitutes a significant burden among ANC attendees at this facility.

Conclusion:

Pre-eclampsia prevalence at Hoima Regional Referral Hospital exceeds both national and regional benchmarks and is driven by intersecting socio-demographic vulnerabilities and obstetric risk factors, demanding urgent programmatic response.

Recommendations:

The hospital should enforce universal blood pressure and urinalysis screening at every ANC contact and implement a formal pre-eclampsia risk stratification protocol at booking. Community-level education and early ANC promotion must be strengthened.

Key words: Prevalence, pre-eclampsia, pregnant women, Hoima regional referral hospital, antenatal care.

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Background

Globally, pre-eclampsia complicates approximately 2-8% of all pregnancies and contributes to an estimated 76,000 maternal and 500,000 neonatal deaths annually (Mercy, 2024). Although maternal deaths due to hypertensive disorders have declined in high-income countries due to improved antenatal care, the burden remains disproportionately higher in resource-limited settings (Luz, 2021).

The World Health Organization (WHO) has repeatedly identified pre-eclampsia and eclampsia as critical drivers of high maternal mortality in Africa, where the lifetime risk of

dying from pregnancy-related causes is 1 in 36, compared to 1 in 2800 in high-income settings (Extension, 2022).

In East Africa, the prevalence of pre-eclampsia ranges between 4% and 10% of pregnancies, with higher rates reported in hospital-based studies, such as 8.7% in Northern Tanzania and 6.3% in Zanzibar (Mwasamba, 2020). Factors including prime gravidity, advanced maternal age, multiple gestation, obesity, and a history of chronic hypertension are worsened by an overall increasing trend in the region, with a pooled incidence of 13% in sub-Saharan Africa, alongside common challenges such as delayed antenatal care attendance and inadequate laboratory monitoring. T

Uganda reflects these trends, with hypertensive disorders of pregnancy ranking among the top causes of maternal mortality (Annette, 2016). Nationally, studies report a pre-eclampsia prevalence of 7%, though rates vary significantly by region (Lugobe, 2020). The persistence of pre-eclampsia has significant implications for maternal and neonatal health due to its multifactorial etiology and challenges such as limited diagnostic capacity, underutilization of antenatal care, and referral delays (Enid, 2024). This study focused on determining the prevalence of pre-eclampsia among pregnant women at Hoima Regional Referral Hospital.

Methodology

Study Design and Rationale

A descriptive cross-sectional study design was used. It was appropriate for this study because it enabled the determination of the prevalence of pre-eclampsia among pregnant women attending ANC during the study period. The design is cost-effective, time-efficient, and suitable for estimating disease burden and identifying associations.

Study Setting

The study was conducted at the Antenatal Unit of Hoima Regional Referral Hospital, located in Hoima Municipality, Hoima District, Western Uganda. The hospital serves as the main referral centre for the entire Bunyoro sub-region, catering to both urban and rural populations from Hoima and neighbouring districts. The Antenatal Unit, situated within the Department of Obstetrics and Gynecology, provides comprehensive antenatal care services including routine blood pressure monitoring, urine testing for proteinuria, laboratory investigations, health education, nutritional counselling, and management of high-risk pregnancies such as pre-eclampsia. The unit attends to approximately 80 pregnant women daily and receives both self-referrals and referrals from lower-level health facilities across the region. This high-volume, diverse catchment population makes the Antenatal Unit of Hoima Regional Referral Hospital an ideal setting for evaluating socio-demographic factors associated with pre-eclampsia.

Study Population

The study population comprised pregnant women aged 15-49 years attending ANC at Hoima Regional Referral Hospital during the study period. This category of respondents was chosen because they are within the reproductive age range and are at risk of developing pre-eclampsia.

Sample Size Determination and Rationale

The sample size was calculated using the Kish and Leslie formula:

$$n = (Z^2 \times p \times q) / d^2 \text{ Where:}$$

$Z = 1.96$ (for 95% confidence level)

$P = 0.121$ (prevalence of pre-eclampsia at Hoima Regional Referral Hospital)

$Q = (1 - p)$

$d = 0.05$ (margin of error). Substituting the values:
 $n = (1.96^2 \times 0.121 \times (1 - 0.121)) / 0.05^2 = 163$

However, due to resource constraints, the sample size was divided by four to enable easy data collection, and this limitation is explicitly stated in the limitations section of this study:

$$n = 163 / 4 = 41$$

Sampling Methods and Procedure

A convenience sampling technique was used to select study participants. This technique was chosen because it is practical, less time-consuming, and appropriate given the short data collection period at a busy antenatal care clinic. The pregnant women aged 15-49 years attending ANC at Hoima Regional Referral Hospital were approached during the study period. The purpose and procedures of the study were clearly explained to each potential participant. Those who met the inclusion criteria and voluntarily gave written informed consent were consecutively recruited until the required sample size was reached. Recruitment was conducted on a daily basis from all eligible women present at the ANC clinic on the days of data collection.

Inclusion Criteria

The study included pregnant women who were of Ugandan nationality, female, aged 15-49 years, able to read and write English, willing to give informed written consent (or whose legal guardian consented for those below 18 years), attending the Antenatal Unit of Hoima Regional Referral Hospital during the study period.

Exclusion Criteria

The following participants were excluded from the study: Pregnant mothers who were very sick and those who withdrew from the study.

Study Variables

Independent variable: Prevalence of pre-eclampsia.

Dependent variable: The occurrence of pre-eclampsia among pregnant women aged 15-49 years attending antenatal care at Hoima Regional Referral Hospital.

Research Instruments/Tool

A structured questionnaire was used as the data collection tool. This instrument was preferred because data were collected over a short period of time from all study participants. The questionnaire ensured uniformity in questioning, reduced missing data, was suitable for

respondents with low literacy levels, and allowed clarification of questions where necessary.

Data Collection Methods and Procedure

Data were collected using an administered structured questionnaire. First, an introductory letter was obtained from Mildmay Institute of Health Sciences and delivered to the Hoima Regional Referral Hospital research committee. The researcher introduced themselves and explained the purpose of the research to study participants to ensure they clearly understood their role in the study. Study participants were allowed to receive their medical attention after being involved in the study. Each participant was interviewed for a maximum of 30 minutes. Those who were not able to understand English had their questions translated into their local language. Additionally, blood pressure measurements and medical records were reviewed to confirm the diagnosis of preeclampsia.

Data Management and Analysis

Study data were analysed manually by simple tallying and addition. Data were subsequently entered and processed using Microsoft Excel. Descriptive statistics were computed to summarise the distribution of socio-demographic and obstetric characteristics of the study participants and to determine the prevalence of preeclampsia.

Data Presentation

The analysed data were presented using Microsoft Excel to generate tables, pie charts, and bar graphs. These visual

formats were used to display the frequency distributions and prevalence of preeclampsia across the various socio-demographic and obstetric variables.

Quality Control

The questionnaire was pre-tested among approximately 10% of the sample size at a nearby health facility not included in the study. Necessary corrections were made to improve clarity and validity. Research assistants were trained and subjected to tests to ensure they fully understood their roles. Additional time was allocated to cover any delays that arose during the data collection process.

Ethical Considerations

Ethical approval was obtained from the Mildmay Research Committee. An introductory letter was obtained from Mildmay Institute of Health Sciences, and permission to collect data was obtained from Hoima Regional Referral Hospital. Written informed consent was obtained from all study participants after explaining the purpose and procedures of the study. Participants were assured of anonymity and confidentiality, as no names were required on the questionnaires. Questions were translated into local languages for participants who did not understand English. Privacy was maintained throughout the interview process. Participants were free to withdraw from the study at any time without fear of any consequences.

Results

Socio-demographic Characteristics of Study Participants

Table 1: Socio-demographic Characteristics of Study Participants (n = 41).

Characteristic	Frequency (n = 41)	Percentage (%)
Age Group (years)		
15 – 24	15	36.6%
25 – 34	18	43.9%
35 – 44	6	14.6%
45 – 49	2	4.9%
Total	41	100%
Marital Status		
Married	32	78.0%
Single / Divorced	9	22.0%
Total	41	100%
Highest Level of Education		
No formal education	8	19.5%
Primary level	16	39.0%
Secondary level	12	29.3%

Tertiary level	5	12.2%
Total	41	100%
Main Source of Income		
None	10	24.4%
Farming	15	36.6%
Business	11	26.8%
Salaried employment	5	12.2%
Total	41	100%
Place of Residence		
Rural / Village	26	63.4%
Urban / Town	15	36.6%
Total	41	100%

With regard to age distribution, 18 out of 41(43.9%) were in the 25-34-year age bracket, followed by those aged 15-24 years, who constituted 15 participants (36.6%). Women aged 35-44 years accounted for 6 participants (14.6%), and 2 participants (4.9%) were in the 45-49 years age category. Regarding marital status, 32 out of 41 (78.0%) were married, while 9 participants (22.0%) were either single or divorced. In terms of educational attainment, 16 participants (39.0%) had attained primary education, followed by secondary-level education at 12 participants (29.3%). Eight

participants (19.5%) had no formal education, while only 5 participants (12.2%) had attained tertiary-level education. Concerning the main source of income, 15 participants (36.6%) were farmers, followed by business at 11 participants (26.8%). Ten participants (24.4%) reported having no income source, while only 5 participants (12.2%) were in formal salaried employment. With respect to place of residence, 26 out of 41 (63.4%) resided in rural or village areas, while 15 (36.6%) lived in urban or town settings.

Prevalence of Pre-eclampsia among Study Participants

Table 2: Shows Distribution of Pre-eclampsia Clinical Indicators among Study Participants (n = 41)

Indicator	Response	Frequency (n= 41)	Percentage(%)
Told by health worker of high blood pressure	Yes	12	29.3
	No	29	70.7
	Total	41	100
Presence of PE symptoms (headache / visual disturbance/edema)	Yes	14	34.1
	No	27	65.9
	Total	41	100
Timing of elevated BP diagnosis (among those with HBP, n = 12)	Before 5 months	3	25.0
	After 5 months	9	75.0
	Total	12	100
Proteinuria confirmed by health worker.	Yes	10	24.4
	No	31	75.6
	Total	41	100
Hospitalized due to high blood pressure in the current pregnancy	Yes	7	17.1
	No	34	82.9
	Total	41	100
	Yes (PE positive)	6	14.6

Diagnosed with preeclampsia (High blood pressure after 20 weeks + proteinuria)	No (PE negative)	35	85.4
	Total	41	100

As shown in Table 2, 12 out of 41 participants (29.3%) reported having been informed by a health worker that they had high blood pressure during the current pregnancy, while 29 participants (70.7%) reported no such diagnosis. Of the 12 women diagnosed with elevated blood pressure, the majority, specifically 9 (75.0%), were told of the condition after five months of gestation (i.e., after 20 weeks), while 3 (25.0%) reported the diagnosis occurring before five months of gestation.

Fourteen participants (34.1%) reported the presence of at least one symptom suggestive of preeclampsia, namely severe headache, visual disturbances, or edema of the legs and hands, while 27 (65.9%) denied the presence of any of

these symptoms. With regard to proteinuria, 10 participants (24.4%) reported that a health worker had confirmed the presence of protein in their urine, while 31 (75.6%) reported no proteinuria.

Seven participants (17.1%) indicated that they had been hospitalized specifically due to high blood pressure during the current pregnancy, with 34 (82.9%) reporting no such hospitalization. Based on the combined criterion of hypertension confirmed after 20 weeks of gestation and confirmed proteinuria, six participants (6 out of 41) were classified as having pre-eclampsia, yielding a prevalence of 14.6% among the study sample.

Figure 1: Shows the proportion of pre-eclampsia status among study participants.

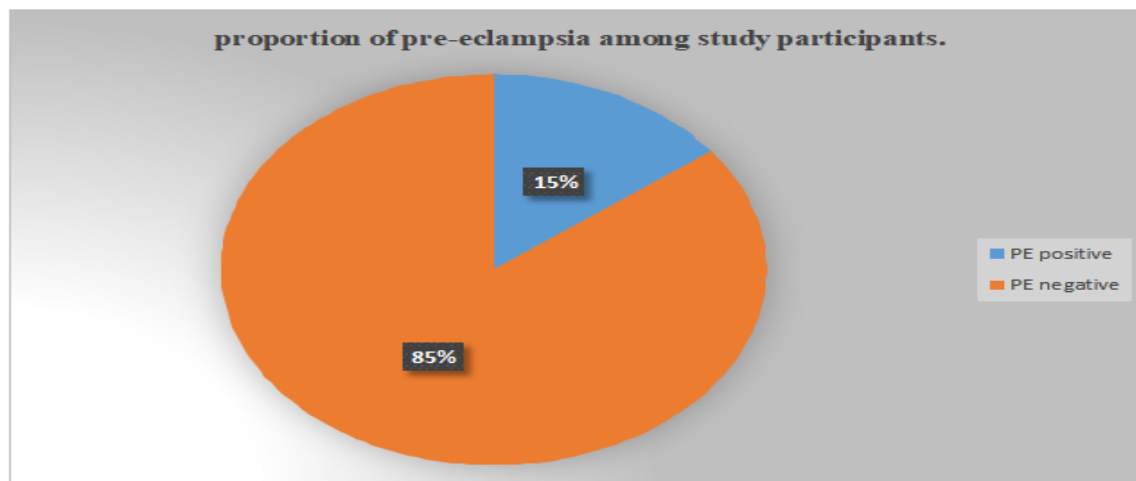


Figure 1 illustrates the overall pre-eclampsia prevalence visually. The pie chart demonstrates that 14.6% of the study participants (n = 6) were classified as pre-eclampsia-positive, while the remaining 85.4% (n = 35) were classified as pre-eclampsia-negative.

Table 3: Cross-tabulation of Socio-demographic Factors and Preeclampsia Status (n = 41).

Variable	Category	Total (n)	PE Positive (n)	PE Prevalence (%)
Age Group (years)	15 – 24	15	2	13.3
	25 – 34	18	1	5.6
	35 – 44	6	2	33.3
	45 – 49	2	1	50.0
	Total	41	6	
Marital Status	Married	32	3	9.4
	Single/Divorced	9	3	33.3
	Total	41	6	

Level of Education	No formal education	8	3	37.5
	Primary level	16	2	12.5
	Secondary level	12	1	8.3
	Tertiary level	5	0	0.0
	Total	41	6	
Main Income Source	None	10	3	30.0
	Farming	15	2	13.3
	Business	11	1	9.1
	Salaried employment	5	0	0.0
	Total	41	6	
Residence	Rural / Village	26	5	19.2
	Urban / Town	15	1	6.7
	Total	41	6	

Table 3 shows the distribution of preeclampsia across selected socio-demographic characteristics among the 41 study participants. Overall, 6 participants were diagnosed with preeclampsia. By age, the prevalence of preeclampsia was highest among women aged 45-49 years (50.0%), followed by those aged 35-44 years (33.3%). In contrast, lower prevalence was noted among younger age groups, particularly 25-34 years (5.6%) and 15-24 years (13.3%). In terms of marital status, participants who were single or divorced had a higher prevalence of pre-eclampsia (33.3%) compared to those who were married (9.4%). Regarding the level of education, women with no formal education had the highest prevalence (37.5%), while no cases were reported among those with tertiary education (0.0%). Analysis of the main source of income showed that participants with no income had the highest prevalence (30.0%), while those in salaried employment had no recorded cases (0.0%). Lower prevalence was observed among participants engaged in farming (13.3%) and business (9.1%). Finally, residence was also associated with pre-eclampsia occurrence, with a higher prevalence among rural residents (19.2%) compared to urban residents (6.7%).

Discussion

Prevalence of Pre-eclampsia

Data analysis and interpretation revealed the following major findings under this objective. It revealed that the prevalence of pre-eclampsia was 14.6% (6 out of 41 participants), with 12 participants (29.3%) reporting a health worker diagnosis of elevated blood pressure, 10 (24.4%) having confirmed proteinuria, and 7 (17.1%) having been hospitalized due to hypertension in the current pregnancy. These findings indicate that pre-eclampsia constitutes a

significant burden among ANC attendees at this facility, exceeding both the national Ugandan prevalence of approximately 7% (Kagoya et al., 2024) and the hospital's own referenced baseline of 12.1% (Okia et al., 2019).

This is probably because Hoima Regional Referral Hospital, as a regional referral centre for the Bunyoro sub-region, concentrates higher-risk pregnancies referred from lower-level facilities, inherently inflating the prevalence observed in its ANC population. Additionally, the predominantly rural, low-income, and low-education catchment population presents with multiple compounding risk factors that elevate pre-eclampsia incidence. These findings agree with Jikamo et al. (2023), who documented sub-Saharan African pre-eclampsia prevalence estimates of 5-10%, and with Muwema et al. (2024), who reported that hypertensive disorders contribute to more than 10% of obstetric admissions at major referral centres in western Uganda. Namwoki (2023) further confirmed that hypertensive disorders of pregnancy account for nearly 10% of global maternal deaths, with a disproportionate burden in low- and middle-income countries (Agnes, 2023a), and that hypertensive complications were specifically documented as a leading cause of obstetric admissions at this same facility, directly corroborating the elevated prevalence recorded in the present study. The researcher concludes that the pre-eclampsia burden at Hoima Regional Referral Hospital demands urgent programmatic attention, including a formal review of screening protocols and sustained investment in blood pressure monitoring and urinalysis infrastructure across all ANC contact points.

Limitations

The use of convenience sampling meant that only women present at the ANC clinic on data collection days were

recruited. This excluded women who attend on different days, those who deliver at home, or those with severe pre-eclampsia already admitted to the ward, potentially skewing results and limiting the generalizability of findings to the broader population in Hoima District.

Page | 7 Conclusion

This study documented that the pre-eclampsia prevalence is considerably higher than the local baseline, which is 12.1%.

Recommendation

Hoima Regional Referral Hospital should establish a formal, written pre-eclampsia risk stratification protocol at ANC booking, incorporating locally validated risk factors identified in this study, including primigravidity, twin gestation, advanced maternal age, low education, and late booking. Blood pressure and urinalysis should be performed at every ANC contact without exception.

The Uganda Ministry of Health should integrate preeclampsia-specific risk stratification tools into the revised national ANC guidelines, drawing on locally generated epidemiological evidence such as this study. Funding should be allocated for the procurement and sustained supply of reagent strips for proteinuria testing at all levels of the healthcare system, including health centres IIIs and IVs in Hoima District.

Future studies should employ larger sample sizes (the full calculated sample size of 163 or above) to provide greater statistical power and more representative prevalence estimates. A prospective cohort or case-control design would enable researchers to establish temporal and causal relationships between identified risk factors and preeclampsia and to calculate adjusted odds ratios.

Researchers should also consider extending the study to include lower-level health facilities in the Bunyoro sub-region, including health centre IIIs and IVs, to obtain a community-level picture of preeclampsia burden that complements the referral hospital data presented in this study.

Implications for Clinical Practice, Policy, and Community Health

The elevated preeclampsia prevalence of 14.6% at Hoima Regional Referral Hospital, which surpasses both the national average and the hospital's own baseline, necessitates a formal review of preeclampsia screening protocols at this facility. Every ANC contact should include standardized blood pressure measurement, dipstick urinalysis for proteinuria, and structured assessment of preeclampsia risk factors.

The identification of older maternal age, low education, poverty, rural residence, primigravidity, multiple gestation, and late ANC booking as key risk factors provides a clear framework for risk stratification at booking. Health workers

at Hoima Regional Referral Hospital should prioritize women with multiple risk factors for intensified surveillance, more frequent ANC visits, and proactive clinical management. The Ugandan Ministry of Health should consider updating ANC risk stratification tools to formally incorporate these locally validated risk factors.

The dramatic difference in preeclampsia prevalence between counselled and non-counselled women (7.4% versus 28.6%) underscores the transformative potential of health education as a primary prevention tool. ANC providers must ensure that all pregnant women receive structured, culturally appropriate education on preeclampsia warning signs at every visit. This is particularly critical for women with low literacy levels, for whom visual aids, community drama, and peer group education may be more effective than conventional leaflets.

At the community level, Village Health Teams (VHTs) in the Hoima District should be strengthened in their capacity to identify and refer high-risk pregnant women, including those who present late or miss ANC appointments. Targeted community outreach for young mothers (below 25 years), older mothers (above 35 years), and rural women, all of whom exhibited disproportionately high preeclampsia rates in this study, should be a priority.

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List of abbreviations

ANC: Antenatal Care

FANC: Focused Antenatal Care

WHO: World Health Organization

Source of funding

The study was not funded.

Conflict of interest

No conflict of interest declared.

Author contributions

KJ: Conceptualization, Methodology, Investigation, Writing-original draft.

HN: Data curation, Formal analysis, Visualization.

FS: Formal analysis, Visualization.

IPN: Writing review and editing

JFN: Supervision, Validation.

All authors: Approved the final version of the manuscript and agreed to be accountable for the work.

Data availability

Data are available upon request.

Informed consent

Written informed consent was obtained from all participants prior to their inclusion in the study. Participants were informed about the purpose of the study, procedures involved, potential risks and benefits, and their right to withdraw at any time without penalty.

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