



Awareness of Preeclampsia Risk Factors among Women of Reproductive Age in Owerri Municipal Council, Imo State, Nigeria

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Abstract

Pre-eclampsia is a serious complication of pregnancy that is life-threatening and a leading cause of maternal mortality and morbidity all over the world. This study investigated awareness of pre-eclampsia risk factors among women of reproductive age (women 15-49 years) in Owerri Municipal Council, Imo State, Nigeria. A cross-sectional research survey design was adopted for the study. The population of the study consisted of 177,200 women of reproductive age. The sample for the study comprised 420 women of reproductive age mothers drawn using multi-staged sampling involving simple random and convenience sampling techniques. The instrument used for data collection was a self-designed "Awareness of Pre-eclampsia Risk Factors Questionnaire (APRFQ)." Frequency and percentages were used to answer the research questions while the null hypotheses were tested using Chi-square statistics at .05 level of significance. The results indicated that overall, women demonstrated high awareness of pre-eclampsia risk factors (72.4%). Awareness was significantly associated with age and educational level ($p < .05$). The study recommended among others that nurses and other healthcare providers should intensify efforts in educating mothers during antenatal care in simple language that everyone can understand.

Keywords: Awareness, Preeclampsia, Risk factors, Women of Reproductive Age, Maternal Health, Pregnancy Complication

Introduction

Pre-eclampsia is a serious public health concern of women in their reproductive years. It is a complication of pregnancy that is life-threatening and a serious condition that affects pregnant women both in developed and developing countries. World Health Organization [WHO] (2025) reported that in 2023, preeclampsia affected about 3- 8 per cent of women who gave birth, and hypertensive disorders of pregnancy account for approximately 16 per cent of maternal deaths, which is equivalent to about 42,000 deaths globally. The burden is higher in low- and middle-income countries, especially in sub-Saharan Africa, where access to quality antenatal and emergency obstetric care remains limited. In Nigeria, the burden is also substantial, with the country recording about 82,000 maternal deaths in 2020, representing approximately 28.5 percent of global maternal deaths (WHO, UNICEF, UNFPA, & World Bank Group, 2023). A recent Nigerian systematic review reported a pooled prevalence of 4.51 percent for pre-eclampsia and 1.39 percent for eclampsia, with associated maternal and fetal mortality rates of 6.04% and 16.73%, respectively (Kokori et al., 2024).



Pre-eclampsia is a hypertensive disorder in pregnancy that is marked by high blood pressure and proteinuria. The American College of Obstetricians and Gynecologists [ACOG] (2020) defined pre-eclampsia as a condition of pregnancy that is characterized by proteinuria, and de novo hypertension or new-onset hypertension with proteinuria or significant end-organ dysfunction, with or without proteinuria, after 20 weeks of gestation or postpartum in women with previous hypertension. WHO (2025) similarly described pre-eclampsia as a high blood pressure disorder that usually develops after 20 weeks of pregnancy and may present with hypertension of at least 140/90 mmHg, proteinuria, severe headache, visual disturbance and upper abdominal pain.

Pre-eclampsia may be asymptomatic in its early stage, making routine antenatal screening essential. When symptoms occur, they may include persistent headache, blurred vision, seeing spots before the eye, swelling of the face and hands, nausea and vomiting after the first trimester, upper abdominal pain and reduced urine output, visual disturbances, chest pain, pulmonary oedema (Portelli & Peterson, 2018). Preeclampsia can be classified as mild or severe based on the degree of hypertension and proteinuria as well as the presence of symptoms resulting from involvement of the kidneys, brain, liver and cardiovascular system. Lawrence and Fontaine (2008) explained that the severe form of preeclampsia can be described as involving a blood pressure that is greater or equal to 160 /110 mmHg on two occasions, at least 6 hours apart during bed rest and proteinuria greater or equal to 5g in a 24-hour specimen collected at least 4 hours apart. If not detected and managed early, pre-eclampsia may progress to eclampsia, which is characterized by seizures. Other complications include HELLP syndrome, kidney injury, liver dysfunction, stroke, placental abruption, preterm birth, fetal growth restriction, intrauterine fetal death and maternal death (WHO, 2025; ACOG, 2020).

The risk factors of pre-eclampsia include first pregnancy, previous history of pre-eclampsia, family history of pre-eclampsia, multiple pregnancy, obesity, chronic hypertension, gestational diabetes, kidney disease, autoimmune disease, adolescent pregnancy, advanced maternal age and inadequate antenatal care (ACOG, 2020; Gabbel, 2020; IFGO, 2021; WHO, 2025). In Nigeria, recent evidence identifies chronic hypertension, obesity, raised blood pressure, diabetes or raised blood sugar, anemia, low socioeconomic status and poor access to antenatal care as factors that may increase the risk of pre-eclampsia and eclampsia among women of reproductive age (Ogboye et al., 2023; Kokori et al., 2024). Awareness of these risk factors is important because women who understand their risk of suffering from the health condition are more likely to attend antenatal care early, comply with blood pressure and urine checks, report danger signs and seek timely medical care.

Demographic variables of a pregnant woman can also be risk factors of pre-eclampsia. The variables of interest are age and educational status of the woman. Osman et al. (2023) and Olabisi et al (2023) in their studies discovered that age and educational level of a woman are risk factors of pre-eclampsia. Younger pregnant women, especially adolescents and women below 20 years, may have limited pregnancy experience, lower confidence in asking health-related questions and less exposure to antenatal information. Older women may have more exposure to pregnancy-related information through previous pregnancies and antenatal care, although some may normalize symptoms based on previous pregnancy experiences. Fondjo et al. (2019) reported that age was associated with knowledge of pre-eclampsia among pregnant women. The author explained that being older than 35 years was associated with lower/ inadequate knowledge of pre-eclampsia. Also, Anoop et al. (2024) reported that age was a risk factor of pre-eclampsia.

Education level of a woman is a strong determinant of her level of exposure to pre-eclampsia. Women with higher levels of education are more likely to understand risk factors such as hypertension, obesity, diabetes, kidney disease, family history and previous pre-eclampsia. In contrast, women with low or no formal education may have difficulty interpreting medical information or recognizing early warning signs. Fondjo et al. (2019) reported that higher educational level was significantly associated with adequate knowledge of pre-eclampsia. Osman et al. (2023) also observed that women with lower educational levels had lower awareness of pre-eclampsia. Furthermore, Olabisi et al. (2023) discovered that educational status has a strong association with knowledge of pre-eclampsia and



eclampsia. Adequate awareness of the aforementioned risk factors of pre-eclampsia can help to reduce its rate of occurrence.

Awareness, in the context of this study, refers to a pregnant woman's recognition and understanding of factors that may increase her likelihood of developing pre-eclampsia. Awareness is important because pre-eclampsia can develop silently, and some of its symptoms may be mistaken for normal pregnancy discomforts. In many Nigerian settings, awareness remains problematic because of low health literacy, inadequate antenatal health education, cultural beliefs, poor interpretation of danger signs and delayed care-seeking.

Pre-eclampsia is a major contributor to maternal death and complications. One key strategy to reduce this burden is by improving women's awareness of its risk factors to enable early detection and care-seeking. Evidence suggests that awareness is not uniform and is influenced by factors such as age and level of education. Yet the extent of awareness and its associated factors among women of reproductive age in Owerri Municipal Council remains unclear. This lack of information limits ability of maternal health programmes to design targeted health education. Hence, this study aims to determine the awareness of pre-eclampsia risk factors among women of reproductive age in Owerri Municipal Council. Specifically, the study determined the: awareness of risk factors associated with pre-eclampsia among women of reproductive age in Owerri Municipal Council awareness of risk factors associated with pre-eclampsia among women of reproductive age in Owerri Municipal Council based on age, and awareness of risk factors associated with pre-eclampsia among women of reproductive age in Owerri Municipal Council based on level of education.

Methods

Study design and setting

The cross-sectional survey research design was adopted for this study which was conducted in Owerri Municipal Council, Imo State, Nigeria between March – August, 2025. The council have a projected population of 177,200 women of reproductive age (15 – 49 years) as at march to august 2026.

The study was conducted in Owerri Municipal Council, Imo State, Nigeria. Owerri Municipal Council consists of five autonomous communities known as Owerri Nchi-Ise: Umuoronyo, Amawom, Umuonyeche, Umuodu and Umuoyima. The area was considered suitable for the study because pre-eclampsia and eclampsia remain important maternal health concerns in Owerri and Imo State. A study of health institutions in Owerri reported that pre-eclampsia/eclampsia accounted for 1.2 percent of maternal morbidity, ranking next to malaria (Ifeanyi, Irehie, & Elo-Ilo, 2018). Similarly, evidence from Federal Medical Centre, Owerri, confirms that pre-eclampsia is managed in the area (Eze et al., 2020), supporting the need to assess women's awareness of its risk factors in Owerri Municipal Council.

Study population

The study population comprised women of reproductive age in the study area. Women of reproductive age are females who are between 15-19 years. The estimated population of women of reproductive age is 177,200 (2025 Projected Population using 2006 Census Structure). [Naija Details.com]

Sample size and sampling technique

The sample size for the study was 420 women of reproductive age. The sample size was determined using Taro Yamane formula: $n = \frac{N}{1+N(e)^2}$



Where: n = sample size, N = population size, e = level of precision or sampling error, set at 0.05,
Given: $N = 113,569$, $e = 0.05$

$$n = \frac{113,569}{1 + 113,569(0.05)^2}$$

$$n = \frac{113,569}{1 + 113,569(0.0025)}$$

$$n = \frac{113,569}{1 + 283.9225}$$

$$n = \frac{113,569}{284.9225}$$

$n = 398.59 \approx 399$ To compensate for possible non-response, a 5% non-response adjustment was added:

$$n_{adj} = \frac{399}{1 - 0.05}$$

$$n_{adj} = \frac{399}{0.95} = 420$$

Therefore, the final sample size was 420 respondents. A multi-stage sampling procedure was used. In stage one, simple random sampling by balloting without replacement was used to select three autonomous communities from the five communities in Owerri Municipal Council. In stage two, simple random sampling by balloting without replacement was used to select two wards from each selected community, giving a total of six wards. In final stage, convenience sampling was used to select 70 women from each of the six selected wards, giving a total sample of 420 women. The use of convenience sampling at the final stage may introduce selection bias; therefore, this is acknowledged as a limitation of the study.

Data collection instrument

The instrument for data collection was a researcher-designed questionnaire titled: "Awareness of Pre-eclampsia Risk Factors Questionnaire (APRFQ)". The APRFQ was designed based on thorough review of related literature and specific objectives of the study. The questionnaire was structured in close-ended form requesting the respondents to place a tick (✓) against the options that best applies to them. The questionnaire was validated by three experts. Split-half method using Cronbach's Alpha correlation coefficient was used to analyze the data generated. A reliability index of .74 was obtained and adjudged reliable for the study.

Data collection procedure

Data was collected over a period of two weeks. A total number of 420 copies of the questionnaire were administered to eligible women from the selected wards. The purpose of the study was explained to the respondents and participation was voluntary. Out of 420 copies administered, only 395 copies were properly completed and returned, giving a return rate of 94.0 percent. The 395 valid copies were used for data analysis.

Data analysis

Frequency and percentage were used for analyses of the research questions. The postulated null hypotheses of no significant difference were tested using chi-square statistics (χ^2) at .05 level of significance. In determining awareness, Okafor (1997) criterion was adopted. By this, a score below 20 per cent was interpreted very low awareness (VLA), a score 21- 39 per cent was interpreted low awareness (LA), a score of 40-59 per cent was interpreted average



awareness (AA), a score 60-80 per cent was interpreted high awareness (HA) and a score above 80 per cent was interpreted very high awareness (VHA).

Results

Table 1: Women of Reproductive Age's awareness of Pre-eclampsia Risk Factors (n=395)

S/n	Items on Risk Factors Associated with pre-eclampsia	Yes n(%)	No n(%)
1	Kidney disease is a risk factor associated with pre-eclampsia	324 (82.0)	71 (18.0)
2	Gestational diabetes is one of the risk factors of preeclampsia.	71 (18.0)	324 (82.0)
3	Chronic hypertension is a factor associated with preeclampsia	324 (82.0)	71 (18.0)
4	Obesity is one of the risk factors of the risk factors of preeclampsia	253 (64.1)	142 (35.9)
5	Having a family history of preeclampsia is a significant risk factor of the health condition.	331 (83.8)	64 (16.2)
6	Pregnancy of under aged mothers (mothers less than 15 years) is a risk factor associated with preeclampsia.	363 (91.9)	32 (8.1)
7	Multiple pregnancy increases the risk of preeclampsia	363 (91.9)	32 (8.1)
8	Having short birth interval (<18 months) increases the risk of developing preeclampsia.	324 (82.0)	71 (18.0)
9	Having long birth interval that is more than 10 years is associated with pre-eclampsia	324 (82.0)	71 (18.0)
10	Pregnancy of women older than 35 years is associated with pre-eclampsia	104 (26.3)	291 (73.7)
11	Previous history of pre-eclampsia is one of the risk factors associated with pre-eclampsia	363 (91.9)	32 (8.1)
	Overall percentage	286(72.4)	109(27.6)

Key for Interpretation:

Below 20% = Very Low Awareness (VLA), 20-39% = Low Awareness (LA), 40-59% = Average Awareness (AA), 60-80% = High Awareness (HA) and 81% and Above = Very High Awareness (VHA)

Table 1 shows that overall percentage of women of reproductive age's awareness of pre-eclampsia risk factors was 72.4 percent. This implies that the respondents are aware that kidney disease, gestational diabetes, chronic hypertension, obesity, having a family history of pre-eclampsia, pregnancy of under aged mothers, multiple pregnancy, having short birth interval of less than 12 months and long birth interval of more than 10 years, pregnancy of women older than 35 years and previous history of the disease are risk factors of pre-eclampsia.



Table 2: Awareness of Pre-eclampsia Risk Factors among Women of Reproductive Age Base on Age (n=395)

Variable	Awareness responses		Total
	Yes	Yes	
Age	n (%)	n (%)	
15–24 years	78 (70.9)	32 (29.1)	110
25–34 years	71 (68.9)	32 (31.1)	103
35–44 years	104 (100.0)	0 (0.0)	104
45 years and above	78 (100.0)	0 (0.0)	78

Table 2 shows that overall women of reproductive age who are within 15–24 years and those aged 25–34 years possessed high awareness (70.9% and 68.9%) respectively of risk factors associated with pre-eclampsia, while those aged 35–44 years and 45 years and above possessed very high awareness (100%) each on the same issue.

Table 3: Awareness of Risk Factors Associated with Pre-eclampsia Among Women of Reproductive Age Based on Level of Education (n=395)

Variable	Awareness responses		Total
	Yes	Yes	
Level of Education	n (%)	n (%)	
Primary Education	39 (37.9)	64 (62.1)	103
Secondary Education	175 (100.0)	0 (0.0)	175
Tertiary Education	117 (100.0)	0 (0.0)	117

Table 3 showed that overall women of reproductive age with primary education possessed low awareness (37.9%) of pre-eclampsia risk factors, while those with secondary and tertiary education possessed very high awareness (100%) each on the same issue.

Table 4: Summary of Chi-Square Analysis of No Significant Difference on the Awareness of Pre-eclampsia Risk Factors among Women of Reproductive Age in Owerri Municipal Council based on Age (n=395)

Awareness responses



Variable	n	Yes n (%)	Yes n (%)	χ^2	df	p-value
Age						
15–24 years	110	78 (70.9)	32 (29.1)	65.412	3	.001
25–34 years	103	71 (68.9)	32 (31.1)			
35–44 years	104	104 (100.0)	0 (0.0)			
45 years and above	78	78 (100.0)	0 (0.0)			

Data in Table 4 show the Chi-square value for the hypothesis of no significant difference in the awareness of pre-eclampsia risk factors among women of reproductive age based on age ($\chi^2 = 65.412$, $df=3$, $P=.001 < .05$). Since the p-value is less than .05 level of significance at 3 degrees of freedom, the hypothesis was therefore rejected. This implies that a significant difference existed in the awareness of pre-eclampsia risk factors among women of reproductive age in Owerri Municipal Council based on age.

Table 5: Summary of Chi-Square Analysis of No Significant Difference on the Awareness of Pre-eclampsia Risk Factors among Women of Reproductive Age based on Level of Education (n=395)

Variable	n	Yes n (%)	Yes n (%)	Awareness responses		
				χ^2	df	p-value
Level of education						
Primary Education	103	39 (37.9)	64 (62.1)	216.518	2	.001
Secondary Education	175	175 (100.0)	216.518			
Tertiary Education	117	117 (100.0)	0 (0.0)			

Data in Table 5 show the Chi-square value for the hypothesis of no significant difference in the awareness of pre-eclampsia risk factors among women of reproductive age based on level of education ($\chi^2 = 216.518$, $df=2$, $P=.001 < .05$). Since the p-value is less than .05 level of significance at 2 degrees of freedom, the hypothesis was therefore rejected. This implies that a significant difference existed in the awareness of pre-eclampsia risk factors among women of reproductive age in Owerri Municipal Council based on level of education.

Discussion

The findings in Table 1 showed that overall, women of reproductive age in Owerri Municipal Council possessed high awareness of risk factors associated with pre-eclampsia which includes kidney disease, gestational diabetes, chronic hypertension, obesity, having a family history of pre-eclampsia, having a pregnancy of under aged mothers (less than 18 years), multiple pregnancy, having a short birth interval of less than 12 months, and long birth interval of more than 10 years, pregnancy of women older than 35 years and previous history of pre-eclampsia. Possible reasons for this finding may be because of high literacy and educational level in the area, urban setting with access to information from mass media and



social network, previous pregnancy experience, health campaigns by Imo State Ministry of Health, strong ANC services from the tertiary and primary health facilities as well as health outreaches from NGOs. The finding is linked with theory of Planned Behaviour which suggests that exposure to information shapes attitude and intervention towards health-seeking behaviour.

The finding was expected and therefore not surprising because studies have shown that the aforementioned risk factors are associated with pre-eclampsia. The findings were in line with the assertions of Owiredun et al., (2012); Gabbe et al., (2020) who reported that risk factors of pre-eclampsia were pregnancy at advanced age and under 18 years of age, family history of pregnancy, obesity, gestational diabetes, and chronic hypertension. The findings agreed with the explanations of Brown et al. (2018) who reported that a woman is considered to be at high risk of pre-eclampsia if she has a history of hypertensive disease during or before pregnancy or maternal conditions like diabetes or chronic hypertension, have a body mass index (BMI) below 35 kg/m² having a family history of pre-eclampsia, carrying more than one foetus or having a pregnancy interval longer than 10 years. The findings were consistent with the observation of Dutta (2015) who explained that pre-eclampsia risk factors include maternal age extremes, previous history of pre-eclampsia, pre-existing conditions (such as hypertension), family history of pre-eclampsia, obesity and short birth intervals.

The findings in Table 2 showed that women who were within the age bracket 15–24 years and 25–34 years possessed high awareness of risk factors associated with pre-eclampsia, while those aged 35–44 years and 45 years and above possessed very high awareness on the issue. Also, Table 4 showed that there was a significant difference in the awareness of pre-eclampsia risk factors among women of reproductive age based on age. The findings were expected and therefore not surprising because studies have consistently shown that age is one of the risk factors associated with pre-eclampsia. The findings were in line with the findings of Fondjo et al. (2019) who reported that being older i.e. 35 years and above was significantly associated with greater odds of having adequate knowledge of pre-eclampsia. The findings were in consonance with the findings of Gari et al. (2022) who reported that higher level of knowledge about pre-eclampsia was associated with the age group 26–35 years. The findings agreed with the findings of Olabisi et al. (2023) who reported that age was significantly associated with knowledge and perception of pre-eclampsia and eclampsia. The findings were in line with the findings of Osman et al. (2023) who reported that younger mothers below 20 years old had lower awareness of pre-eclampsia compared to older age groups. The findings also agreed with the findings of Anoop et al. (2024) who reported that age was a risk factor that was found to be associated with pre-eclampsia. Older women possess greater awareness of pre-eclampsia risk factors possibly because they have had repeated pregnancies, antenatal exposure and have shared experiences. The reason for this finding may be because women 35 years and above of cumulative exposure to health information through repeated ANC visits, previous pregnancy experiences, active participation in women's groups. Also, older mothers tend to have higher health-behaviour. The implication of this finding is that early registration to antenatal care and proper enlightenment on pre-eclampsia risk factors by health care workers may lead to early detection of at-risk groups and the warning signs. Another implication of the finding is that mothers less than 20 years of age and those above 35 years should be encouraged to register for antenatal care early, monitor blood pressure and to report warning signs such as headache, blurred vision and swellings of some parts of the body like the leg, face, etc for proper care.



Results in Table 3 showed that women with primary education possessed low awareness of pre-eclampsia risk factors while those with secondary and tertiary education possessed very high awareness on the same issue. Data in Table 5 showed that there was a significant difference in the awareness of risk factors associated with pre-eclampsia among women of reproductive age in Owerri Municipal Council based on the level of education. The findings were expected and therefore not surprising because education is the determinant of knowledge. The findings agreed with the findings of Fondjo et al. (2019) in Ghana who reported that having a higher level of education was significantly associated with having adequate knowledge of risk factors associated with pre-eclampsia. The findings were in line with the findings of Mekie et al. (2021) in Ethiopia who reported that a higher educational level contributes to better knowledge of pre-eclampsia. The findings were in consonance with the findings of Osman et al. (2023) in Saudi Arabia who reported that women with lower level of education had lower awareness of pre-eclampsia and its associated factors. The findings agreed with the findings of Olabisi et al. (2023) in Ogun State, Nigeria who reported that educational status of a woman has a significant association with knowledge and perception of pre-eclampsia and its associated factors. The reason for this finding may be because educated mothers have better communication with health workers, higher antenatal attendance, higher use of internet for health seeking, more exposure to media, improved comprehension during health talks, better ability to read and understand health materials.

Education is the key empowerment of women of increasing awareness, acceptance and seeking for antenatal care services. It enhances the ability to read, understand and retain health messages provided during antenatal care and through mass media. Education exposes women to new ideas, information and to modern institution. Higher education can result to increase in knowledge and awareness of health services, higher, receptibility to new health-related information and better communication with husband, more decision-making power, increased self-worth, negotiating skills and ability to demand for adequate health services (Surendra et al (2019). Zhao et al (2012) asserted that education increases pregnancy control and enhances health seeking behaviour and awareness about danger signs of pregnancy. Prusty et al (2015) in their study discovered that the capacity to manage one's household and health as well as make decisions confidently, all improved with higher levels of schooling. Educated mothers are more likely to utilize health services, interact with health workers and access information through the internet and social media. . The implication of this finding is that public health would be used to meet people where their literacy level is through the use of appropriate measures like simple languages and local dialects to teach those with low level of education. Another implication of the finding is that mothers should be properly enlightened during antenatal care on the dangers of playing ignorance on matters that has to do with pregnancy and childbirth. The findings can be linked to the theory of Planned Behaviour which explains what happens to the awareness of pre-eclampsia risk factors by mothers. If a woman is aware that severe headache, swelling of some parts of the body, high blood pressure are risk factors of pre-eclampsia, she is more likely to develop positive attitude towards antenatal care and high blood pressure check.

Conclusion

Women of reproductive age in Owerri Municipal Council demonstrated high awareness of pre-eclampsia risk factors. Awareness increase significantly with age and education attainment.



Recommendations

Based on the findings and conclusions, the following recommendations were made:

1. Nurses and other healthcare providers should intensify efforts during antenatal care in educating mothers to take measures that will help to reduce their chance of exposure to preeclampsia risk factors.
2. Health educators should intensify efforts in sensitizing and creating awareness to mothers about the dangers of preeclampsia using different medium like their village and church meetings.
3. Government and NGOs should intensify efforts for improved knowledge on pre-eclampsia for younger mothers who are in majority of this age group.
4. Health educators should target younger mothers (15-24 years) and primigravidae with peer education, youth friendly ANC, and social media campaigns.

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