



Pregnant women attending major health facilities in South Eastern Nigeria: A case control study on the socioeconomic status of pre-eclampsia/eclampsia

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Abstract

Eclampsia (EC) is a severe form of preeclampsia, whereas preeclampsia (PE) is a pregnancy-induced illness. They pose a serious threat to obstetric health and are impacted by a number of variables, including socioeconomic status. The goal of the current study was to assess how socioeconomic status (SES) affected pregnant women in South Eastern Nigeria who had pre-eclampsia and eclampsia. Major public health facilities in two randomly chosen states in South Eastern Nigeria—Abia and Imo—were included in the retrospective case control research. It was carried out with pregnant women who were at least 20 weeks along and who were attending the main public health facilities in both states: Federal Medical Center Owerri (now known as the Federal University Teaching Hospital) and Imo State Specialist Hospital Owerri from Imo State, and Federal Medical Center Umuahia and Abia State General Hospital, Umuahia from Abia State. The medical facilities are representative of the two states' main public health facilities. Age and family variables, economic class, educational attainment, and employment/occupational category are among the SES elements taken into account in the study. The SES data was collected using a standardized questionnaire. Additional data were collected at the study's medical facilities. Descriptive and inferential statistical methods were used to analyze the collected data. The mean and standard deviations are examples of summary statistics that are employed in descriptive statistical techniques. Distributional charts and frequency distribution construction are two more. The chi-square test method was used to examine whether there was a correlation between the socioeconomic position of the women during the study period and the rates of incidence of preeclampsia/eclampsia. All inferential tests were conducted at the 5% level of significance. The study's findings indicate that 3010 pregnant women's data was equally collected in both states. Age ($P=0.01$, $\chi^2=31.41$) is one socioeconomic status characteristic that was found to be substantially associated with preeclampsia in this study. Preeclampsia was most common in women aged 35–49 years ($OR=2.64$, $95\% CI = 1.83-3.79$), but it was least common in women aged 20–34 years (6.7%). Additionally, it was shown that nuliparity was significant [$P=0.006$, $OR= 1.76$ ($95\% CI: 1.15 - 2.71$)]. Employment status [unemployment: $P=0.0026$, $OR= 1.93$ ($95\% CI: 1.23 - 3.03$)] and residual job category [$P=0.012$, $OR= 1.74$ ($95\% CI: 1.10 - 2.76$)] were also found to be significant. History of PE ($P<0.0001$), family history of hypertension ($P<0.0006$), chronic hypertension ($P=0.0145$), and excess body weight of greater over 80 kg ($P=0.0031$) are clinical and obstetric variables that are linked to PE. In the study area, preeclampsia-eclampsia continues to be a devastating pregnancy challenge, and the contribution of socioeconomic status to the disease's occurrence has not yet been thoroughly examined.

Keywords: Preeclampsia, eclampsia, pregnant women, Major Public Facilities in South East, Socio-economic status.

INTRODUCTION

In 3-8% of pregnancies, eclampsia and pre-eclampsia are among the leading causes of increased maternal and perinatal mortality and morbidities, making them significant issues in the area of obstetrics. A hazardous illness unique to pregnancy and the postpartum period, preeclampsia (PE) affects both the mother and her fetus [1]. A 24-hour specimen with a systolic blood pressure of greater than 140 mmHg or a diastolic blood pressure of greater than 90 mmHg and proteinuria of more than 0.3 gm is considered hypertensive. It usually appears after 20 weeks of pregnancy. In the past two decades, preeclampsia has risen by about 25% worldwide in both postpartum and maternal women [2].

Eclampsia is a complicating factor of severe preeclampsia because it is characterized by an extreme spectrum of preeclampsia, described as new beginnings of generalized seizure, and/or an unexplained coma that appears during pregnancy or during puerperium in a patient with preeclamptic symptoms. [3]

The severe, persistent illnesses known as preeclampsia and eclampsia can result in mortality and disability for both the mother and her fetus. High blood pressure, proteinuria, and a rapid progression are their defining characteristics. They can also result in low platelet counts, liver or kidney problems, and deficiencies in the brain and eyes.

Preeclampsia-eclampsia is ranked as one of the three primary causes of maternal and newborn mortality and morbidity globally. Presently, preeclampsia itself affects 2–8% of newborns globally.

However, eclampsia without proteinuria and hypertension has been found in 38% of individuals reported in the UK [4]. Compared to 2% of women worldwide, 10% of pregnant African women suffer from schizophrenia.

Preeclampsia and eclampsia problems can have short-term negative repercussions as well as long-term ones. The fetus and the mother may be affected. One of these financial consequences is a reduction in fetal development that makes the fetus more compressible [5]. Fetal health and weight are also significantly altered, and varying degrees of fetal morbidities and damage occur.

Preeclampsia is defined by the American College of Obstetricians and Gynecologists as an obstetrical illness marked by the presence of hypertension and indicators of end-organ dysfunction, such as cerebral impairment or liver or kidney dysfunction. Pre-eclampsia symptoms include moderate to severe headaches, vision changes, upper abdominal pain, decreased output, vomiting, shortness of breath, liver dysfunction, low blood platelet levels, sudden weight gain, and facial edema. [6]

A headache, which can be dull and pounding and be either continuous or sharp and severe, is one of the main signs of preeclampsia. Permanent changes to vision are also discernible; they may include temporary blindness, blurred vision, or an increase in light sensitivity. These anomalies in vision are believed to be caused by the deterioration of the blood vessels in the eye. [7]

Preeclampsia's other symptom is upper abdominal pain, which usually manifests as soreness on the right side of the chest under the ribs. It's possible to have intense pain that even spreads to the shoulders or back. Reduced urine production is one of the symptoms of preeclampsia, which suggests that the kidneys are also affected. Additionally, nausea and vomiting are symptoms of preeclampsia, and they can be severe enough to One of the clinical indicators of preeclampsia is dyspnea, which is caused by pulmonary edema, or fluid buildup in the lungs. One of the signs of preeclampsia involves liver difficulties and this may cause damage to the liver.

A sudden increase in weight and edema are symptoms of eclampsia, an obstetric disease brought on by fluid retention. According to data from the American College of Obstetricians and Gynecologists, or ACOG, preeclampsia complicates 2–8% of pregnancies globally. While the precise origin of preeclampsia is uncertain, inadequate blood flow to the placenta and poor placentation are known to be associated with the condition [9]. Pulmonary edema, or fluid buildup in the lungs, is the cause of dyspnea, one of the clinical indicators of preeclampsia. Liver damage is one of the symptoms of preeclampsia, which includes liver problems. Preeclampsia is often associated with thrombocytopenia, a platelet count of less than 150,000 platelets per microliter of blood that is associated with an elevated risk of bleeding.

Pregnant women with poor levels of education and illiteracy are additional possible causes of preeclampsia. It has been discovered that in women with lower levels of education, the condition is more common and more severe [10].

There is a lot of conflicting research regarding the relationship between occupation and preeclampsia; as a result, the current study found no statistically significant correlation between the two. A meta-analysis research, on the other hand, found that a physically demanding profession was a major risk factor for preeclampsia [11].

Because they can disrupt routine prenatal care, long work hours or occupational weariness have been linked to an increased risk of preeclampsia, eclampsia, and other pregnancy-related problems. [12]

Up to 11% of all maternal deaths nationwide are caused by preeclampsia. However, it is still unknown how common preeclampsia and eclampsia are in Nigeria in relation to the economic standing of pregnant women. Therefore, this study assessed the socioeconomic status of pregnant women in South East Nigeria in order to estimate the incidence of preeclampsia/eclampsia [13]. Severe preeclampsia and eclampsia are conditions that only happen during pregnancy and are made worse by high rates of morbidity and mortality in both mothers and babies. This is due to the fact that the two diseases have varied rates of occurrence and mortality in various parts of the world. Predisposing factors in low-resource countries increase the risk of preeclampsia more than in high-resource ones. According to the National Population Council, various developing countries, including Nigeria,

[14]. Lack of resources, inadequate prenatal care, and restricted access to quality hospital care were cited as some of the factors causing the high prevalence. However, preeclampsia trends and their relationship to socioeconomic status factors have received comparatively more attention in recent years; however, there are inconsistencies, time variations, and in some cases, gaps in the conceptual framework, as well as inadequate information on the actual roles of the SES factors. [15]

There is currently little research relating Nigerian pregnant women's socioeconomic status to the prevalence of preeclampsia and eclampsia. Consequently, the index study seeks to fill in the current knowledge gaps.

MATERIALS AND METHODS

Study Design

This study employed a health facility-based retrospective design, utilizing data extracted from hospital records via a proforma. The proforma captured information on pregnant women who attended the study health facilities between 2016 and 2021

Study Area

The study was carried out in South Eastern region, Nigeria. South Eastern region is one of the six geopolitical zones in Nigeria representing both a geographic and political region of the country's inland southeast. It comprises five states – Abia, Anambra, Ebonyi, Enugu and Imo.

The region has a population of 22 million people, around 10% of the total population of the country. The zone is bounded by the River Niger on the west, the riverine Niger Delta on the south. Others include the north central parts of Kogi and Benue states in the north and parts of Cross River State in the east, different types of vegetations are practiced in the zone which includes the Guinean savanna and the swampy savanna in parts of the riverine areas.

Sample Size and Sampling Methods

The data was not collected directly from the mothers through primary sampling methods. Instead, it was obtained as secondary data, gathered from pre-existing documented records at the study health facilities, spanning the study period of 2016 to 2021.

Inclusion and Exclusion criteria

Information pertaining to all pregnant women, including those diagnosed with preeclampsia (PE) and eclampsia (E), who attended the Obstetrics and Gynaecology unit of the selected study health facilities during the study period spanning from 2016 to 2021, was comprehensively included in the study. This encompassed a thorough examination of medical records, ensuring that data on all pregnant women who received care at the participating facilities during the specified timeframe was incorporated into the study. By casting a wide net and capturing data on all relevant cases, the study aimed to provide a holistic understanding of PE and E occurrences within the study population, facilitating a more accurate and generalizable analysis of these conditions.

Included Cases

The cases included were pregnant women diagnosed with pre-eclampsia after the 20th week of gestation, (i.e systolic blood pressure ≥ 140 mmHg or diastolic ≥ 90 mmHg) on two occasions at least four hours apart and proteinuria defined as urinary protein ≥ 300 mg in 24hr period or $\geq 1+$ on a urine dipstick on two occasions of up to 4 hours apart without urinary tract infection. This included pregnant women attended the study health facilities within the period February to April, 2021.

Severe preeclampsia was taken as Systolic blood pressure ≥ 160 mmHg/Diastolic blood pressure ≥ 110 mmHg, presence of pulmonary edema, epigastric pain and proteinuria; persistent (2gm/24 hours or $\geq +2$ dipstick). Others include progressive renal insufficiency and oliguria, elevated liver enzymes, new onset cerebral or visual disturbance and low platelets count $<100,000$ /ml.

Included Controls

The included controls were all randomly selected pregnant women who were above 20th week of gestation, and were not diagnosed with pre-eclampsia. Two women were randomly selected within 24 hours of every selected case of preeclampsia in a particular health facility of study.

Excluded Cases and Controls.

The study excluded all pregnant women who were critically ill, cognitively impaired, or with the history of cardiovascular diseases, endocrine diseases, autoimmune diseases, renal diseases, AIDS, and cancer.

Instruments for Data Collection

Instrument of data collection include a questionnaire instrument constructed by the researcher. The questionnaire was prepared by sections. Section A contained the sociodemographic characteristics of the respondents, section B contained information concerning the socio-economic status of the participants while section C contained pregnancy

The instruments of data collection employed in this study included:

A specially designed data collection table prepared by the researcher, comprising rows and columns to systematically capture and document relevant information.

Electronic medical records of pregnant women, which provided detailed data on preeclampsia and eclampsia cases, including clinical notes, laboratory results, and treatment outcomes.

Socioeconomic characteristic forms, which gathered information on participants' demographic profiles, including age, parity, education level, occupation, and income status

These instruments enabled the researcher to comprehensively collect and document data on preeclampsia and eclampsia cases, as well as the socioeconomic factors that may influence these conditions. By utilizing a combination of structured data collection tools and existing electronic medical records, the study ensured a thorough and accurate capture of relevant data, facilitating a robust analysis of the research questions.

Validity of Instruments

Face validity and content validity were utilized to validate all the questionnaires. The study questionnaire was meticulously prepared by the researcher in alignment with the study objectives and subsequently approved by the supervisor after incorporating minor corrections. Furthermore, expert inputs were obtained from two specialists in gynecology and obstetrics, which significantly contributed to refining the final study instruments.

Reliability of Instruments

The test-retest method was employed to evaluate the reliability of the instruments. This method is a robust approach to assess the reliability of questionnaires. It involves administering the questionnaire twice to a subset of participants from the study population. In this study, a total of twenty-five pregnant women with a gestational age of at least 20 weeks were randomly selected for reliability assessment purposes, but were not included in the main study. The questionnaire was initially administered to them, and then repeated a week later. The results were scored, compared, and analyzed for consistency using the Cronbach Alpha test. A reliability coefficient of 0.731 (not 7.31, assuming a scale of 0 to 1) was obtained, indicating a high level of reliability. Therefore, the questionnaire instrument was deemed reliable for this study.

Method of Data Collection

The data collection for preeclampsia and eclampsia cases was conducted through weekly visits to the Obstetrics and Gynecological Department of each study health facility. During each visit, all identified cases that satisfied the inclusion criteria were selected and enrolled as study subjects. The necessary information from the patients' medical records, including their name, age, address, and registration details were obtained.

Data Analysis

Data analysis was conducted using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA). The initial data analysis employed descriptive statistics, including: Frequencies, Percentages, Means, Standard deviations.

Descriptive analysis was utilized to calculate the rates of preeclampsia and eclampsia, as well as the frequencies of various variables. The proportion of pregnant women with preeclampsia and eclampsia was computed in relation to the total number of deliveries during the study period, allowing for the calculation of the prevalence of each condition in the study area.

RESULTS

Socioeconomic Characteristics of study Group

The socioeconomic characteristics of groups studied are contained in table 4.1. The table shows that in total, more than half of the women studied (472: 62.9%) were within 20 -34 years of age, while 194 (25.9%) and 84 (11.2%) comprised of women within 35 – 49 years and those below 20 years old respectively.

For the preeclampsia/eclampsia case group, the 20 -34 years were 124 (49.6%), while the 35 - 49 years and the under twenties were respectively 94 (37.6%) and 32 (12.8%). Similarly, for the control group, the 20-34 years old also dominated the group at 348 (69.6%), followed by the 35 - 49 years at 100 (25.9%) while those below 20 years of age were 52 (10.4%).

Greater number of the participants had secondary education level (353: 47.1%), which comprised of 119 (47.6%) in the case group and 234 (46.8%) in the control group. Those that had tertiary education were 250 (33.3%), of which 80 (32%) were in the case group and 170 (34%) were in the control group. Just 6.4% (number = 48) did had no formal education (case group =5.6%, control group =6.8%).

Concerning the income status of the study group, the largest income earning group falls on 51,000 -100,000 naira earners at a frequency of 276 (36.8%) in all (cases = 84 or 33.6%, control = 192 or 38.4%). Only about one quarter of the subjects (190: 25.3%) earn above 100,000 naira per month. The proportion earning above 100,000 naira monthly, was a bit higher in control (130:26%) than in the case group (60: 24%). Some were also earning below the national minimum of #30.000 (cases= 47 or 18.8%, control = 66 or 13.2%, total = 113 or 15.1%).

Slightly less than half of the total participants (353: 47.1%) fall within intermediate job occupational category, especially among the control group (228: 45.6%). Less than one quarter in total (173: 23.1%) were employed with senior category jobs. They were 63 (25.2%) in the case group and 110 (22.0%) in the control group. Those who were either unemployed or were engaged with residual jobs were 224 (29.9%) in total (cases= 62: 24.8%, control = 162: 32.4%).

Other characteristics studied include family type and parity. Clear majority of the women were from monogamous family (cases= 241: 96.4%, control = 472: 94.4%, total= 713: 95.1%). Their parity characteristics indicates that a total of 231 (30.8%) were of nulliparity (has never given birth), of which 33.2% in cases, 29.6% were in the control group. Those that had parity of 1-2 times were 210 (41.7%), comprising of 107 (42.8%) in the case group and 206 (41.2%) in the control group.

Table 4.1: Socioeconomic Characteristics of study Group (represented with cases and control groups for preeclampsia)

Socioeconomic Factors	Cases (n=250)		Control (n=250)		Total (n=500)	
	Freq	Percent (%)	Freq	Percent (%)	Freq	Percent (%)
Age (years)						
Below 20	32	12.8	52	10.4	84	11.2
20 – 34	124	49.6	348	69.6	472	62.9
35 -49	94	37.6	100	20.0	194	25.9
Total	250	100	500	100	750	100
Education Level						
Non Formal	14	5.6	34	6.8	48	6.4
Primary	37	14.8	62	12.4	99	13.2
Secondary	119	47.6	234	46.8	353	47.1
Tertiary	80	32.0	170	34.0	250	33.3
Total	250	100	500	100	750	100
Income Status						
Below 30,000	47	18.8	66	13.2	113	15.1
30, 000- 50,000	59	23.6	112	22.4	171	22.8

51, 000- 100,000	84	33.6	192	38.4	276	36.8
Above 100,000	60	24.0	130	26.0	190	25.3
Total	250	100	500	100	750	100
Occupational Category						
Unemployed/ Residual	62	24.8	162	32.4	224	29.9
Intermediate	125	50.0	228	45.6	353	47.1
Senior category	63	25.2	110	22.0	173	23.1
Total	250	100	500	100	750	100
Family Type						
Monogamous	241	96.4	472	94.4	713	95.1
Polygamous	9	3.6	28	5.6	37	4.9
Total	250	100	500	100	750	100
Parity						
Nulliparity (0)	83	33.2	148	29.6	231	30.8
1-2	107	42.8	206	41.2	313	41.7
3 and above	60	24.0	146	29.2	206	27.5
Total	250	100	500	100	750	100

Discussion

Eclampsia and preeclampsia are serious issues in obstetric health that can affect both the mother and the fetus. They are expected to be affected by a variety of factors, including socioeconomic status factors [16]. Therefore, the main objective of this study was to investigate the relationship between the socioeconomic position of pregnant women and the prevalence of eclampsia and preeclampsia in southeast Nigeria. Numerous socioeconomic status triggers were identified in this investigation as important risk factors for preeclampsia. These include age, income level, and employment/occupational category. Age was found to have a substantial impact on the prevalence of preeclampsia in the research area, with high-risk women 35 years of age and older and those under 20 years of age having a higher chance of getting the illness.

This finding is not surprising as the majority of adolescent women are likely less aware of the sickness risk factors before getting pregnant. There is a substantial correlation between age and preeclampsia/eclampsia, with younger women under 20 years old at increased risk [17]. Furthermore, the disease is more likely to strike women 35 years of age and older [18], and a different study indicated that maternal age up to 30 years of age and older was a strong predictor of increased risk for pre-eclampsia/eclampsia. This finding would suggest that preeclampsia in this study is more likely to develop among women of reproductive age who differ in age. The socioeconomic position of mothers was significantly correlated with their age, and younger mothers had more severe preeclampsia.

"Nevertheless, it remained unclear if preeclampsia and age were significantly correlated. [18]. The nuliparity group in this study had a considerably higher incidence of preeclampsia. This is possible since preeclampsia contains anti-angiogenic chemicals that might produce nuliparity. The 20th

Education is another socioeconomic factor examined in this study. Despite not being significantly associated with preeclampsia in the current study, the preeclampsia risk was greater among women with less or no formal education than among those with higher education. In line with this finding, low educational attainment was also significantly associated with an elevated risk of pre-eclampsia/eclampsia. The 21st

Preeclampsia severity and education were found to be statistically significantly correlated. The results of the current study showed that women with lower educational attainment had a more severe form of preeclampsia, while women with higher educational attainment had a milder form of the condition. Similarly, it has been demonstrated that women with low educational attainment have a higher risk of developing preeclampsia, and that women with intermediate educational attainment have a higher risk of developing preeclampsia than those with the highest level of education [22].

"Among the three groups of women in the study area with primary, secondary, and tertiary education levels, the rate did not differ significantly. It may therefore imply that concentrating on formal education could lower preeclampsia rates [23].

A significant risk factor for preeclampsia was also identified in the current study as income, with a higher risk of the condition being associated with lower income. Given that lower income is likely to limit access to high-quality healthcare and health spending, this finding is tenable. Reports indicate that preeclampsia may be influenced by social problems and restricted access to medical care [24]. Women with lower socioeconomic position are more likely to develop preeclampsia, according to numerous studies.

This is likely due to the fact that women with lower incomes may not have as much access to high-quality healthcare, which could delay the diagnosis and treatment of the condition. In addition, women with lower incomes may not have as much access to nutrient-dense dietary options, which could increase their risk of preeclampsia [25]. Preeclampsia can also develop as a result of social factors, such as stress, worry, and a lack of social support. Women with lower incomes may feel more stressed and anxious due to financial constraints, which may increase their risk of preeclampsia [26]. Finally, women with lower incomes may not have as much access to health education, which may increase their risk of preeclampsia [27]. Health education is crucial in empowering women to take control of their health and make informed decisions about their care.

Preeclampsia symptoms may be harder for women without access to health education to recognize, which could delay diagnosis and treatment. The study's overall conclusions emphasize how critical it is to address the social determinants of health in order to lower the risk of preeclampsia. Preeclampsia risk can be reduced for women with lower incomes by policies and programs that provide access to quality healthcare, health education, and social support [30]. There was no evidence in this study that having a home, a functional car, and landed properties had a significant effect. This finding contrasted with that of another study that found a statistically significant relationship between the intensity of PE and family possessions.

As a result, it highlights how important it is to actively comprehend the elements that lead to the development of preeclampsia and eclampsia due to family possession [31]. Those who were unemployed, partially employed, or residual workers had a higher risk of preeclampsia than those who were completely employed or in a senior job category, according to the current study, which found a substantial correlation between preeclampsia and employment or occupational status. This outcome is a clear representation of reality, since unemployment and residual employment are likely to lead to low income and low work satisfaction. Low income levels were found to be much more likely to be associated with preeclampsia than high income levels in a study including a Swedish population [32,33].

Preeclampsia was found to be more common in women from polygamous families than in women from monogamous families, despite the fact that family type was not clearly shown to be a significant associated factor of preeclampsia in this study[34]. Although the relationship between family type and these factors was not examined in this study, it may indicate that other family-related factors, such as income and employment status, may have influenced the study's findings. Most stressful jobs may be physically taxing, require long hours, and cause occupational fatigue, all of which are risk factors for preeclampsia [35].

Conclusion

One risk factor for preeclampsia is a low socioeconomic status of the mother. Maternal socioeconomic status characteristics, including as age, income, employment, and occupational type, had a significant impact on the occurrence of eclampsia and preeclampsia in the research area. Clinical and obstetric factors including as obesity, persistent hypertension, and a history of preeclampsia are also considered risk factors for preeclampsia. The results of the current study indicate that age disparities have a role in the higher incidence of preeclampsia, with women over 35 being especially at risk. Pregnant women without formal education are at risk for preeclampsia in addition to unemployment or poor vocational position. There is no evidence in this study that the prevalence of pre-eclampsia is influenced by the kind of family—polygamous or monogamous. Since there aren't many well-documented studies on preeclampsia and socioeconomic status in Nigeria, additional research of this type may be necessary to identify the socioeconomic elements that contribute to preeclampsia.

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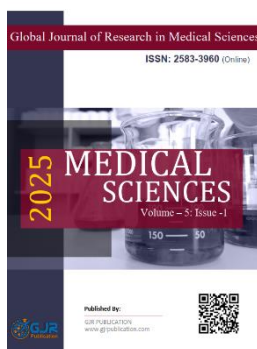
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