

Risk Factors Associated with Endometriosis among Women of Reproductive Age Attending Gynaecology Clinic in a Tertiary Hospital in Southeast Nigeria

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ABSTRACT

Background: Endometriosis is a chronic gynecological disorder characterized by the presence of endometrial-like tissue outside the uterus, often associated with chronic pelvic pain and infertility. Despite its significant health burden, limited research has explored its risk factors in Nigerian women. This study investigates the risk factors associated with endometriosis among women of reproductive age attending a tertiary hospital in Southeast Nigeria.

Methods: A hospital-based, descriptive cross-sectional study was conducted at the gynecology clinic of a tertiary hospital in Southeast Nigeria. Women aged 15–49 years presenting with fertility challenges were recruited using systematic random sampling. Data collection involved a pretested structured questionnaire and a review of clinical records. Endometriosis diagnosis was confirmed through laparoscopic, histological, or clinical criteria. Statistical analysis using SPSS software (version 26.0) included descriptive and inferential statistics, with significance set at $p < 0.05$.

Results: Of the 421 participants, 24.47% were diagnosed with endometriosis. Significant risk factors included age ($p = 0.017$), education level ($p = 0.001$), history of reproductive surgery ($p < 0.001$), early menarche ($p = 0.023$), and prolonged infertility ($p = 0.004$). Lifestyle factors such as smoking and frequent exposure to environmental toxins were more common among participants with endometriosis. Women with a high intake of processed foods had a higher prevalence compared to those with a balanced diet.

Conclusion: Endometriosis is a prevalent condition among women with fertility challenges in Southeast Nigeria. Key risk factors include age, education level, reproductive history, and lifestyle factors. Public health initiatives should focus on early detection, awareness campaigns, and addressing modifiable risk factors to reduce the burden of endometriosis.

Keywords: Endometriosis, Reproductive age, Risk factors, Infertility, Lifestyle factors

INTRODUCTION

Endometriosis is a chronic gynecological condition characterized by the presence of endometrial-like tissue outside the uterus, leading to pelvic pain, dysmenorrhea, and infertility. Globally, it affects approximately 10% of women of reproductive age, varying prevalence rates across different populations. In Nigeria, studies have reported varying prevalence rates; for instance, a survey among the Igbo population reported an incidence of 4.3% in patients undergoing pelvic operations ^[1].

Several risk factors have been associated with the development of endometriosis. Nulliparity, or never having given birth, has been identified as a significant risk factor, as pregnancy induces a temporary cessation of menstruation, reducing estrogen exposure ^[2] Early menarche, short menstrual cycles, and a family endometriosis history are also contributory factors. ^[3]

In the African context, endometriosis has often been underdiagnosed or misdiagnosed, leading to a misconception of its rarity among African women. Factors contributing to this include limited awareness among healthcare providers and the public, inadequate access to diagnostic facilities, and cultural taboos surrounding menstrual health ^[4].

A study by ^[5] reported a prevalence of 48.1% among Nigerian women undergoing diagnostic laparoscopy, indicating that the condition may be more common than previously thought. The impact of endometriosis on women's health is profound, often resulting in chronic pelvic pain, infertility, and a reduced quality of life. Despite this, there is a paucity of research focusing on the risk factors associated with endometriosis among Nigerian women, particularly in the southeastern region. Understanding these risk factors is crucial for early diagnosis and effective management of the condition.

This study aims to investigate the risk factors associated with endometriosis among women of reproductive age attending gynecology clinics in a tertiary hospital in Southeast Nigeria. By identifying these factors, the research seeks to contribute to the existing body of knowledge and inform healthcare strategies to improve the diagnosis and management of endometriosis in the region.

MATERIALS AND METHODS

Study Design

This was a hospital-based, descriptive cross-sectional study designed to evaluate the risk factors associated with endometriosis among women of reproductive age attending the gynecology clinic of a tertiary hospital in Southeast Nigeria.

Study Area

The study was conducted in the gynecology clinic of a Tertiary Hospital in southeast Nigeria. This hospital was chosen due to its high volume of patients with fertility issues, availability of experienced medical personnel, and advanced diagnostic facilities for gynecological disorders.

Study Population

The study population included women of reproductive age (15–49 years) presenting with fertility challenges and attending the gynecology clinic. Fertility challenges were defined as the inability to conceive after 12 months of regular, unprotected sexual intercourse. Participants were recruited based on the following inclusion and exclusion criteria:

Inclusion Criteria:

1. Women aged 15–49 years diagnosed or suspected of having fertility challenges.
2. Attendees of the gynecology clinic during the study period.
3. Women who provided informed consent to participate in the study.

Exclusion Criteria:

1. Women who declined consent.
2. Women with diagnosed infertility due to causes unrelated to endometriosis (e.g., male factor infertility or structural abnormalities unrelated to endometriosis).

Sample Size Determination

The sample size was determined using the Cochran formula for estimating proportions in a population outlined by ^[6]

$$n = \frac{Z^2(Pq)}{e^2}$$

where n = minimum sample size

Z = 1.96 at 95% confidence level,

P = known prevalence of endometriosis in Nigeria

e = error margin tolerated at 5% = 0.05

q = 1 - p

According to a recent study by Fawole et al. (2015), the prevalence of endometriosis in Nigeria is 48.1%.

P = 48.1% = 0.481

q = 1 - p

= 1 - 0.481

= 0.519

$$n = \frac{(1.96)^2(0.481 \times 0.519)}{(0.05)^2}$$

$$n = \frac{3.8416 \times (0.249639)}{0.0025}$$

$$n = \frac{0.959}{0.0025} = 383.61$$

The minimum sample size was 384, but it was adjusted to 421 to account for a 10% non-response rate.

Sampling Technique

To recruit participants, a systematic random sampling technique was used. Patients were selected from the clinic register using a sampling interval calculated by dividing the estimated patient population during the study period by the sample size.

Data Collection Tools

1. **Structured Questionnaire:** A pretested structured questionnaire was used to collect data. The questionnaire consisted of four sections:
 - Section A: Sociodemographic data (age, marital status, education level, occupation).
 - Section B: Symptomatology and medical history.
 - Section C: Lifestyle and Environmental Factors
 - Section D: Reproductive History
2. **Clinical Records Review:** Participants' medical records were reviewed to confirm the diagnosis of endometriosis and assess relevant clinical details.

Data Collection Procedure

Data collection was conducted over twelve (12) months. Participants were briefed about the study objectives and provided written informed consent before completing the questionnaire. Trained research assistants administered the questionnaires in a private setting to ensure confidentiality. Clinical records were reviewed with participants' permission to confirm the diagnosis and assess related clinical parameters.

Diagnostic Criteria for Endometriosis

Participants were classified as having endometriosis based on one or more of the following criteria:

1. Laparoscopic confirmation of endometriosis.
2. Histological confirmation of endometriotic lesions.
3. Clinical diagnosis based on characteristic symptoms (e.g., chronic pelvic pain, dysmenorrhea, dyspareunia) and exclusion of other causes.

Data Analysis

Data were entered into SPSS software (version 26.0) for analysis. Descriptive statistics (mean, standard deviation, frequencies, and percentages) were used to summarize sociodemographic data and levels of awareness. Occurrences of endometriosis were calculated as the proportion of participants with confirmed cases. Chi-square was used to analyse the factors influencing the occurrence of endometriosis and data were considered significant at $p < 0.05$.

Ethical Considerations

Participants were informed about the study's objectives, assured of confidentiality, and allowed to withdraw at any stage without consequences. Data were anonymized to protect participants' privacy.

RESULTS

The majority of respondents were aged 30–39 years (52.26%), with the predominant education level being secondary education (62.23%). Most participants were self-employed (61.76%) (**Table 1**). Common symptoms included dysmenorrhea (33.66%) and pelvic pain (27.72%). A significant proportion (57.24%) experienced symptoms for over three years, and all participants (100%) had consulted a healthcare provider. Diagnoses were led by fibroids (44.28%) and polycystic ovary syndrome (20.90%). Notably, 75.53% of respondents used medications for symptom relief, and 73.40% underwent fertility treatments. Half (50.12%) reported being informed about the impact of endometriosis on fertility (**Table 2**).

Table 1: Sociodemographic Data

Variable	Frequency (n = 421)	Percentage (%)
Age		
<20 years	08	1.90
20–29 years	131	31.12
30–39 years	220	52.26
40–49 years	62	14.73
Education Level		
No formal education	00	0.00
Primary education	22	5.23
Secondary education	262	62.23
Tertiary education	137	32.54
Occupation		
Full House wife	46	10.93
Self-employed	260	61.76
Civil servant	102	24.23
Others	23	5.46

Table 2: Symptomatology and Medical History

Variable	Frequency (n = 421)	Percentage (%)
*Have you experienced any of the following symptoms? (Select all that apply) (n = 826)		
Pelvic pain	229	27.72
Pain during menstruation (dysmenorrhea)	278	33.66
Pain during intercourse (dyspareunia)	116	14.04
Heavy or irregular menstrual bleeding	49	5.93
Fatigue	123	14.89
Others	31	3.75
How long have you experienced these symptoms?		
<6 months	17	4.04
6 months–1 year	57	13.54
1–3 years	106	25.18
>3 years	241	57.24
Have you consulted a healthcare provider for these symptoms?		
Yes	421	100.00
No	00	0.00
*Have you been diagnosed with any of the following? (Select all that apply) (n = 603)		
Endometriosis	103	17.08
Fibroids	267	44.28
Polycystic Ovary Syndrome (PCOS)	126	20.90
Pelvic Inflammatory Disease (PID)	84	13.93
Others	23	3.81
Have you had surgery related to reproductive health?		
Yes	63	14.96

No	358	85.04
Have you used any medications for symptom relief?		
Yes	318	75.53
No	103	24.47
How would you describe the impact of these symptoms on your daily life?		
Severe	96	22.80
Moderate	174	41.33
Mild	110	26.13
No impact	41	9.74
Have you undergone any fertility treatments?		
Yes	309	73.40
No	112	26.60
Have you been told by a healthcare provider that endometriosis might affect your fertility?		
Yes	211	50.12
No	210	49.88
Do you have a family history of endometriosis?		
Yes	87	20.67
No	202	47.98
Unsure	132	31.35

Most respondents reported not smoking (97.39%) and not consuming alcohol (71.73%). Regular exercise (26.37%) and a balanced diet (41.81%) were noted, though 27.79% reported exposure to environmental toxins. Hormonal contraceptive use was reported by 29.45% (**Table 3**). The majority of participants started menstruating at 13–15 years (81.47%) and had menstrual cycles lasting 21–28 days (69.36%). Approximately 53.92% had been trying to conceive for 4–6 years. Among those who had been pregnant, 93.13% reported 1–2 pregnancies (**Table 4**). The occurrence of endometriosis was 24.47%, while 75.53% did not have the condition (**Figure 1**).

Table 3: Lifestyle and Environmental Factors

Variable	Frequency (n = 421)	Percentage (%)
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Do you smoke cigarettes?		
Yes	11	2.61
No	410	97.39
Do you consume alcohol?		
Yes	119	28.27
No	302	71.73
How often do you exercise?		
Never	13	3.09
Rarely	85	20.19
Occasionally (1–2 times a week)	212	50.36
Regularly (3 or more times a week)	111	26.37
What is your typical diet?		
High in fruits and vegetables	137	32.54
High in processed foods	109	25.89
Balanced diet	176	41.81
Do you frequently use hormonal contraceptives?		
Yes	124	29.45
No	297	70.55
Are you exposed to environmental toxins (e.g., chemicals, pesticides)?		
Yes	117	27.79
No	87	20.67
Unsure	217	51.54

Table 4: Reproductive History

Variable	Frequency (n = 421)	Percentage (%)
At what age did you start menstruating (menarche)?		
Before 10 years	00	0.00
10–12 years	67	15.91
13–15 years	343	81.47
After 15 years	11	2.61

What is the average length of your menstrual cycle?		
Less than 21 days	11	2.61
21–28 days	292	69.36
29–35 days	94	22.33
More than 35 days	24	5.70
How long have you been trying to conceive?		
Less than 1 year	00	0.00
1–3 years	110	26.13
4–6 years	227	53.92
More than 6 years	84	19.95
Have you ever been pregnant before?		
Yes	131	31.12
No	290	68.88
If yes, how many pregnancies have you had?		
1–2	122	93.13
3–4	09	6.87
5 or more	00	0.00
Have you experienced complications during pregnancy?		
Yes	129	30.64
No	02	0.48
Not applicable	290	68.88

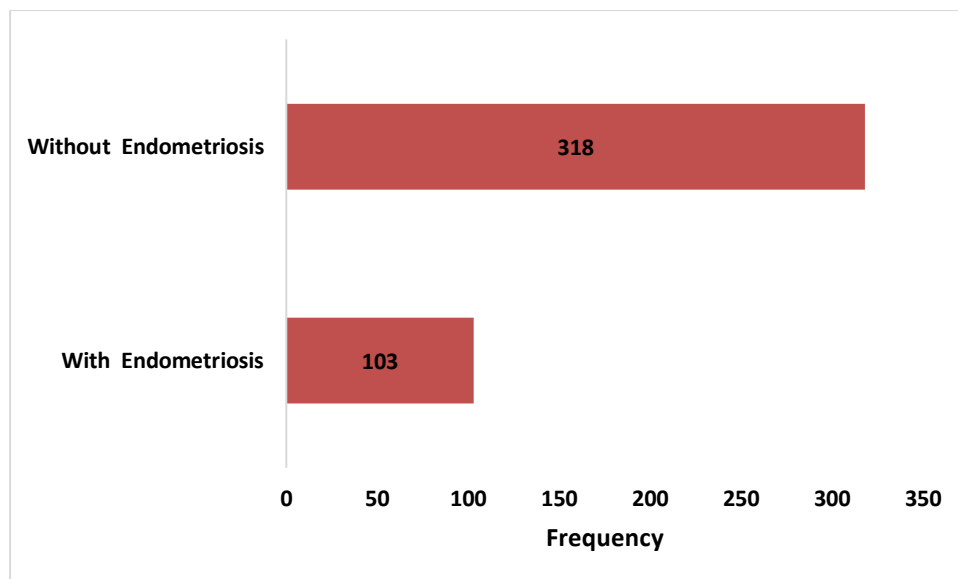


Figure 1: Occurrence of Endometriosis

Table 5: Risk Factors influencing Endometriosis among Women of Reproductive Age in Nigeria

Risk Factors	Endometriosis		p-value
	Yes n (%)	No n (%)	
Age			
<20 years	00 (0.00%)	8 (100.00%)	
20–29 years	00 (0.00%)	131 (100.00%)	
30–39 years	76 (34.55%)	144 (65.45%)	
40–49 years	27 (43.55%)	35 (56.45%)	0.017*
Education Level			
No formal education	00 (0.00%)	00 (0.00%)	
Primary education	13 (59.09%)	09 (40.91%)	
Secondary education	82 (31.30%)	180 (68.70%)	
Tertiary education	08 (5.80%)	129 (93.47%)	0.001*
Have you had surgery related to reproductive health?			
Yes	48 (76.19%)	15 (23.81%)	
No	55 (15.36%)	303 (84.64%)	0.000*
Have you undergone any fertility treatments?			0.712

Yes	77 (24.92%)	232 (75.08%)	
No	26 (23.21%)	86 (76.79%)	
Do you have a family history of endometriosis?			
Yes	51 (58.62%)	36 (41.38%)	
No	28 (13.86%)	174 (86.14%)	
Unsure	24 (18.18%)	108 (81.82%)	0.010*
Do you smoke cigarettes?			
Yes	02 (18.18%)	09 (81.82%)	
No	101 (24.63%)	309 (75.37%)	0.614
Do you consume alcohol?			
Yes	61 (51.26%)	58 (48.74%)	
No	42 (13.91%)	260 (86.09%)	0.001*
How often do you exercise?			
Never	08 (61.54%)	05 (38.46%)	
Rarely	42 (49.41%)	44 (51.76%)	
Occasionally (1–2 times a week%)	45 (21.23%)	167 (78.77%)	
Regularly (3 or more times a week%)	08 (7.21%)	103 (92.79%)	0.003*
What is your typical diet?			
High in processed foods	59 (54.13%)	50 (45.87%)	
High in fruits and vegetables	19 (13.87%)	118 (86.13%)	
Balanced diet	25 (14.20%)	151 (85.80%)	0.021*
Do you frequently use hormonal contraceptives?			
Yes	53 (42.74%)	71 (57.26%)	
No	50 (16.84%)	247 (83.16%)	0.014*
Are you exposed to environmental toxins (e.g., chemicals, pesticides%)?			
Yes	59 (50.43%)	58 (49.57%)	0.033*

No	04 (4.60%)	83 (95.40%)	
Unsure	40 (18.43%)	177 (81.57%)	
At what age did you start menstruating (menarche%)?			
Before 10 years	00 (0.00%)	00 (0.00%)	0.000*
10–12 years	42 (62.69%)	25 (37.31%)	
13–15 years	61 (17.78%)	282 (82.22%)	
After 15 years	00 (0.00%)	11 (100.00%)	
What is the average length of your menstrual cycle?			
Less than 21 days	07 (63.64%)	04 (36.36%)	0.011*
21–28 days	95 (32.53%)	197 (67.47%)	
29–35 days	01 (1.06%)	93 (98.94%)	
More than 35 days	00 (0.00%)	24 (100.00%)	
How long have you been trying to conceive?			
Less than 1 year	00 (0.00%)	00 (0.00%)	0.269
1–3 years	32 (29.09%)	78 (70.91%)	
4–6 years	52 (22.91%)	175 (77.09%)	
More than 6 years	19 (22.62%)	65 (77.38%)	
Have you ever been pregnant before?			
Yes	31 (23.66%)	100 (76.34%)	0.912
No	72 (24.83%)	218 (75.17%)	

Data were considered significantly different at $p < 0.05$ represented by *

DISCUSSION

This study aimed to investigate the risk factors associated with endometriosis among women of reproductive age attending a gynecology clinic in a tertiary hospital in Southeast Nigeria. The findings provide valuable insights into the sociodemographic, clinical, and lifestyle factors contributing to the prevalence and impact of endometriosis in this population. The prevalence of endometriosis was highest among women aged 30–39 years (34.55%) and 40–49 years (43.55%). This aligns with studies conducted by ^[7] and Parasar et al. (2017), which identified the peak incidence of endometriosis in women aged 30–45 years, likely due to prolonged exposure to menstrual cycles and hormonal fluctuations. Educational level also showed a significant association ($p = 0.001$),

with the highest prevalence among those with primary education (59.09%). This finding suggests that lower educational attainment may contribute to delayed healthcare-seeking behavior and limited awareness, as previously noted by ^[8].

Pelvic pain (27.72%) and dysmenorrhea (33.66%) were the most commonly reported symptoms. These findings are consistent with studies by ^[9], who identified pelvic pain and dysmenorrhea as hallmark symptoms of endometriosis. The prolonged duration of symptoms (>3 years in 57.24% of participants) highlights the challenges of timely diagnosis, corroborating findings by ^[10], which reported an average diagnostic delay of 6–10 years.

A significant association was observed between previous reproductive health surgeries and endometriosis ($p = 0.000$). Women who had undergone surgery were more likely to be diagnosed with endometriosis (76.19%). This is consistent with findings by ^[11], which indicated that surgical interventions might uncover latent cases of endometriosis.

The study revealed significant associations between lifestyle factors and endometriosis. Alcohol consumption ($p = 0.001$), lack of regular exercise ($p = 0.003$), and diets high in processed foods ($p = 0.021$) were positively associated with endometriosis. These findings align with Sanchez et al. (2020), who identified alcohol consumption and sedentary lifestyles as risk factors for chronic gynecological conditions, including endometriosis. Additionally, exposure to environmental toxins ($p = 0.033$) was linked to higher prevalence rates, supporting findings by ^[12] on the role of endocrine-disrupting chemicals in the pathogenesis of endometriosis.

Early menarche (10–12 years, $p = 0.000$) and shorter menstrual cycles (<21 days, $p = 0.011$) were significantly associated with endometriosis. These results are consistent with research by ^[13], which highlighted early menarche and hypermenorrhea as risk factors due to prolonged and frequent exposure to retrograde menstruation. However, the study did not find a significant association between parity and endometriosis ($p = 0.912$), diverging from previous studies ^[14] that reported protective effects of parity. A family history of endometriosis was significantly associated with the condition ($p = 0.010$), with 58.62% of participants with endometriosis reporting a positive family history. This finding corroborates the genetic predisposition to endometriosis reported by ^[15].

While our study's findings are consistent with global trends, some differences exist. For instance, the prevalence of endometriosis in this study (24.47%) is higher than the global average of 10–15% reported by ^[16]. This disparity could be attributed to regional differences in healthcare access, diagnostic criteria, and awareness levels. Furthermore, unlike studies in Western populations that emphasize smoking as a risk factor ^[17], smoking was not significantly associated with endometriosis in this population, likely due to the low prevalence of smoking among Nigerian women.

Clinical Implications

These findings underscore the need for targeted educational and screening programs to address the burden of endometriosis in Southeast Nigeria. Healthcare providers should prioritize early diagnosis and management strategies, particularly for women with a family history, early menarche, and prolonged or severe symptoms.

CONCLUSION

This study highlights several sociodemographic, lifestyle, and reproductive factors significantly associated with endometriosis. Future research should explore genetic and environmental interactions to provide a comprehensive understanding of this condition. Policymakers should integrate these findings into national health programs to improve diagnostic accuracy and patient outcomes.

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