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ORIGINAL RESEARCH

Infertility and Endometriosis

Symptoms of endometriosis among indigenous African women

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Abstract

Background: Endometriosis is a common gynecological disease that significantly impacts women's health. It presents with dyspareunia, dysmenorrhea, chronic pelvic pain, and infertility. Globally, the prevalence of endometriosis is estimated to be 10%, with comprehensive literature on its clinical presentation in developed countries. However, only scant literature exists in Africa.

Objective: To determine the symptoms of endometriosis in indigenous African women.

Methods: This was a prospective analytical cross-selection study that enrolled indigenous African women undergoing laparoscopic surgery in two tertiary hospitals in Nairobi, Kenya. The study population included women aged 18-49 years scheduled for laparoscopic surgery. Data on patient history, clinical, laparoscopic, and histopathological findings were entered and analyzed using the IBM statistical package for social sciences (SPSS), version 22.0. The statistical significance was set at $p<0.05$.

Results: Between March 2018 and March 2021, 443 women were enrolled in this study. The mean age was 33. The prevalence of histologically confirmed endometriosis was 6.8%. Chronic pelvic pain (scale 8-10), dysmenorrhea, and dyspareunia were the significant symptoms of endometriosis ($p<0.001$). Nulliparous patients were more likely to develop endometriosis (OR=4.1 (1.6-10.2)). Women with menarche at ≤13 years had a significantly higher risk of developing endometriosis ($p=0.001$). There was no correlation between infertility and endometriosis ($p=0.031$).

Conclusion: The prevalence of histologically confirmed endometriosis in indigenous Africans was 6.8%. Endometriosis prevalence in Africa is comparable to the worldwide prevalence, and as such, with its morbidity, it warrants close attention. Chronic pelvic pain, dysmenorrhea, and dyspareunia are significant symptoms of endometriosis, and as such, patients with these symptoms should be investigated for endometriosis.

Keywords: endometriosis, laparoscopy, indigenous African woman, dyspareunia, dysmenorrhea

Introduction

Endometriosis is a female genital tract disease that entails the presence of ectopic endometriotic glands and stroma external to the endometriotic cavity, mainly in the pouch of Douglas, pelvic peritoneum, and ovaries (1). Endometriosis is one of the most common gynecological diseases that affects approximately 10% of women. Chronic pelvic pain, dysmenorrhea, dyspareunia, and infertility are all clinical manifestations (1). The incidence of endometriosis in women with chronic pelvic pain and infertility is approximately 51-59% (2). The etiology, clinical manifestation, and understanding of the pathology of endometriosis remain elusive despite years of research and financial commitments (3). Current research has not sufficiently investigated socioeconomic, racial, and geographical distribution factors in the clinical manifestation of endometriosis.

The manifestations and clinical symptoms are well authenticated in developed countries. However, there are inadequate data on endometriosis from Africa (4). The current perception is that endometriosis hardly affects Africans (3,4). Indigenous African women are described as those born and residing in Africa (4). Laparoscopic surgery is the gold standard for endometriosis diagnosis. However, it is not widely practiced in Africa, and as such, the clinical presentation of endometriosis is not well defined (4). Laparoscopic surgery through visualization and biopsy with histological confirmation of endometriosis has transformed its management (5,6). The clinical presentation and anatomical site of endometriosis vary from one person to another. The primary types of endometriosis are deep infiltrating endometriosis (DIE), ovarian endometrioma, and superficial peritoneal endometriosis (7-9).

In Nigerian African women, the prevalence of endometriosis in hysterectomy and laparotomy specimens was 8.2% and 4.3%, respectively (7,8). Early marriage, multiple pregnancies, subsequent breastfeeding, and a high prevalence of pelvic inflammatory disease have been proposed as the basis for the low prevalence of endometriosis of African women (4). The adoption of a Western lifestyle and improved socioeconomic status in African women are expected to increase the prevalence of endometriosis in Africa. Lack of sufficient laparoscopy amenities and diagnostic techniques for endometriosis could explain the apparent low endometriosis prevalence in Africa. Inadequate specialized training and mentorship in laparoscopic surgery in African gynecologists may be a factor in the poor diagnosis of endometriosis (4). The determination of the clinical manifestation of endometriosis in indigenous African women is necessary, given this disease's severe morbidity and public health intricacy. Hence, this study sought to determine the symptoms of endometriosis in indigenous African women.

Methods

Study design

This was a prospective analytical cross-selection study whose primary outcome measure was the clinical presentation of laparoscopic diagnosis and histologically confirmed endometriosis in indigenous African women.

Study setting

The study was conducted in two purposively selected hospitals, namely the Nairobi Hospital and Kenyatta National Hospital (KNH) in Nairobi, Kenya. Nairobi Hospital is a private facility, whereas KNH is public. The facilities are among the largest referral, teaching, and research private and public hospitals in Kenya, with an 1800 and 750-bed capacity, respectively.

Study population

The study population included indigenous African women between 18-49 years of age scheduled for laparoscopic surgery at the two hospitals. The women who met the inclusion criteria were enrolled in the study until the sample size of 443 was achieved. The study respondents were adequately informed about the objectives and benefits of the study and were required to consent.

Data collection and management

The study respondents were preoperatively evaluated for medical history and clinical investigations. They were examined under anesthesia (EUA) to visualize endometriotic lesions. Laparoscopy was performed, and the clinical findings were documented. The Wong-Baker faces pain rating scale (WBS) was utilized to assess pain (10). The anatomical locality, clinical appearance, and clinical stage of the endometriosis were documented. The revised America Society for Reproductive Medicine (Revised ASM) was used to describe the endometriosis stage and extent (11). Biopsies of subtle lesions were taken even if endometriosis was not suspected. Endometriosis was histologically confirmed using hematoxylin and eosin (H&E) stain. The clinician completed the structured questionnaire postoperatively, and the principal investigator confirmed the completeness of the information. The data were verified, and double entered using the Microsoft Access database.

Data analysis

Data were analyzed using the IBM statistical package for social sciences (SPSS), version 22.0. Chi-square and logistic regression analyses were performed to determine the predictors of endometriosis among women scheduled for laparoscopic surgery. The statistical significance was set at p<0.05.

Ethical consideration

Ethical approval for this study was obtained from the Kenyatta National Hospital- University of Nairobi Ethics Research Committee (KNH/UoN ERC) (registration number P798/12/2015).

Results

Between March 2018 and March 2021, 443 women were enrolled in the study. The mean age was 33 years. There was a significant correlation between single women and endometriosis (p<0.001), while age, marital status, occupation, and education level were not related to endometriosis development (**Table 1**).

Nulliparous women had a higher likelihood (OR=4.1(1.6-10.1)) of developing endometriosis. Dysmenorrhea and early menarche (≤13 years) had a significant risk of developing endometriosis (p<0.001), while menorrhagia, multi-parity, and abortions were not significantly associated with endometriosis (**Table 2**).

The localization of nodules in the pouch of Douglas (POD) and adnexal tenderness were significantly associated with the presence of endometriosis (p<0.001). Endometriosis was not associated with pelvic mass, extroverted uterus, and lower abdominal tenderness (**Table 3**).

Endometriosis was clinically diagnosed by laparoscopic visualization in 77 women, and out of these, 30 had histological confirmation of endometriosis, resulting in a prevalence rate of 6.8% (4.8 – 9.5) (**Table 4**).

Chronic pelvic pain (scale 8-10), dysmenorrhea, and dyspareunia were significant symptoms of endometriosis (p<0.001). In contrast, chronic pelvic pain (scale 1-3 and 4-7), pelvic congestion, and low back pain were not associated with endometriosis (**Table 5**).

Chronic pelvic pain and dysmenorrhea were the most common symptoms of endometriosis, followed by dyspareunia, low back pain, and pelvic congestion (**Figure 1**).

Chronic pelvic pain was more common in women with deep infiltrating endometriosis than in those with superficial peritoneal and ovarian endometriomas (**Table 6**).

Fifty percent of women with endometriosis had infertility. However, there was no correlation between infertility and endometriosis (p=0.031) (**Table 7**).

Infertility was reported in 50% and 45.5% of women with endometriosis and without endometriosis, respectively (**Figure 2**).

Women presenting with endometrioma and deep infiltrating endometriosis had a higher probability of having infertility than in those with superficial peritoneal endometriosis (**Table 8**).

Table 1: Sociodemographic characteristic and endometriosis prevalence

Characteristics	Total, n (%) N=443	Endometriosis, n (%)	No endometriosis, n (%)	OR (95% CI)	P-value
Age					
Mean	33.0	30.4	33.2	-	0.011
Range	[18-49]	[18-46]	[18-49]	-	-
≤ 24	29 (6.5)	5 (16.7)	24 (5.8)	1	
25 – 29	108 (24.4)	6 (20.0)	102 (24.7)	3.5(1.0-12.6)	0.039
30 – 34	132 (29.8)	11 (20.0)	121 (29.3)	2.3(0.7-7.3)	0.146
≥ 35	174 (39.3)	8 (26.7)	166 (40.2)	4.3(1.3-14.3)	0.010
Education level					
None	40 (2.1)	8 (1.2)	32 (2.5)	1	
Primary	443 (23.0)	148 (23.1)	295 (23.0)	0.5 (0.2-1.1)	0.082
Secondary	942 (49.0)	323 (50.4)	619 (48.3)	0.5 (0.2-1.1)	0.061
Tertiary	322 (16.7)	107 (16.7)	215 (16.8)	0.5 (0.2-1.1)	0.091
Missing	176 (9.2)	55 (8.6)	121 (9.4)	-	-
Marital status					
Married	357 (80.6)	18 (60.0)	339 (82.1)	1	
Separated	33 (7.4)	1 (3.3)	32 (7.7)	1.7 (0.2-13.1)	0.607
Single	51 (11.5)	11 (36.7)	40 (9.7)	0.2 (0.1-0.4)	<0.001
Widowed	2 (0.5)	-	2 (0.2)	-	-
Occupation					
Employed	271 (61.2)	20 (66.7)	251 (60.8)	1	
Self-employed	92 (20.8)	3 (10.0)	89 (21.5)	2.3 (0.7-8.1)	0.161
Not-employed	80 (18.1)	7 (23.3)	73 (17.7)	0.8 (0.3-2.0)	0.686

Table 2: Gynecological history and endometriosis prevalence

Characteristic	Total, n (%) N=443	Endometriosis, n (%)	No endometriosis, n (%)	OR (95% CI)	P-value
Parity					
Median	0	0	1	-	
Range	[0-8]	[0-2]	[0-8]	-	0.001
0	228 (51.5)	24 (80.0)	204 (49.4)	1	-
1	60 (13.5)	3 (10.0)	57 (13.8)	2.2 (0.6-7.7)	0.191
2	65 (14.7)	3 (10.0)	62 (15.0)	2.4 (0.7-8.3)	0.146
≥3	90 (20.3)	-	90 (21.8)	-	-
No. of abortions					
Mean	0	0	0	-	0.198
Median	0	0	0	-	0.309
Range	[0-5]	[0-1]	[0-5]	-	-
0	356 (80.4)	26 (86.7)	330 (79.9)	1	
1 - 3	83 (18.7)	4 (13.3)	79 (19.1)	1.6 (0.5-4.6)	0.419
4+	4 (0.9)	-	4 (1.0)	-	-
Age at menarche (yrs.)					
Mean	13.0	12.4	13	-	0.001
Median	13.0	12.5	13	-	0.001
Range	11-21	11-14	11-21	-	
10-12	116 (26.2)	15 (50.0)	101 (24.5)	1	
13-15	323 (72.9)	15 (50.0)	308 (74.6)	3.0 (1.4-6.5)	0.002
16+	4 (0.9)	-	4 (1.0)	-	
Duration of flow (days)					
Mean	5	6	5	-	0.442
Median	5	6	5	-	0.835
Range	0-10	4-10	0-10	-	-
0-3	30 (6.8)	0	30 (7.3)	-	
4-7	349 (78.8)	28 (93.3)	321 (77.7)	1	-
8+	64 (14.4)	2 (6.7)	62 (15.0)	2.7 (0.6-11.6)	0.165
Menorrhagia	81 (18.3)	2 (6.7)	79 (19.1)	0.3 (0.1-1.3)	0.09
Dysmenorrhea	107 (24.2)	23 (76.7)	84 (20.3)	12.9 (5.3-31.0)	<0.001

Table 3: Physical findings and endometriosis prevalence

Characteristic	Total, n (%) N=443	Endometriosis, n (%)	No Endometriosis, n (%)	OR (95% CI)	P-value
Lower abdominal tenderness	116 (26.2)	14 (46.7)	102 (24.7)	2.7 (1.3-5.7)	0.01
Pelvic mass	93 (21.0)	2 (6.7)	91 (22.0)	0.3 (0.1-1.1)	0.05
Adnexal mass	85 (19.2)	8 (26.7)	77 (18.6)	1.6 (0.7-3.7)	0.28
Adnexal tenderness	71 (16.0)	13 (43.3)	58 (14.0)	4.7 (2.2-10.1)	<0.001
Extroverted uterus	26 (5.9)	3 (10.0)	23 (5.6)	1.9 (0.5-6.7)	0.32
Nodules POD	6 (1.4)	3 (10.0)	3 (0.7)	15.2(2.9-78.8)	<0.001
Normal findings	167 (37.7)	8 (26.7)	159 (38.5)	0.6 (0.3-1.3)	0.2

Table 4: Histological findings of endometriosis

	n	%
Clinical endometriosis by laparoscopic visualization	77	17
Histologically confirmed endometriosis	30	6.8

Table 5: Symptoms versus presence of endometriosis

Characteristic	Total, n (%) N=443	Endometriosis, n (%)	No endometriosis, n (%)	OR (95% CI)	P-value
Dysmenorrhea	95 (21.4)	25 (83.3)	70 (16.9)	24.5 (9.1-66.2)	<0.001
Chronic pelvic pain	152 (34.3)	26 (86.7)	126 (30.5)	14.8 (5.1-43.3)	<0.001
Scale of Pain					
0	6 (4.0)	0	6 (4.8)		
1 – 3	68 (45.3)	5 (19.2)	63 (50.8)	1	
4 – 7	58 (38.7)	9 (34.6)	49 (39.5)	0.4 (0.1-1.4)	0.146
8 - 10	18 (12.0)	12 (46.2)	6 (4.8)	0.01(0.0-0.2)	<0.001
Dyspareunia	52 (11.7)	11 (36.7)	41 (9.9)	5.3 (2.3-11.8)	<0.001
Pelvic congestion	67 (15.1)	5 (16.7)	62 (15.0)	1.1 (0.4-3.1)	0.81
Low back pain	61 (13.8)	6 (20.0)	55 (13.3)	1.6 (0.6-4.2)	0.31

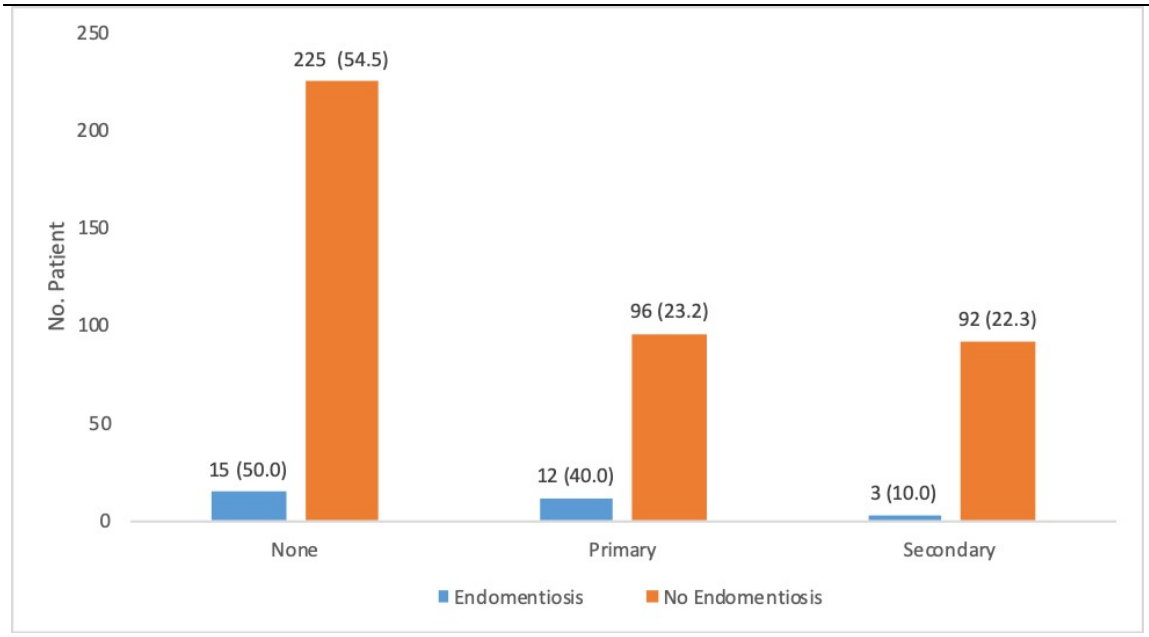

Figure 1: Symptoms of endometriosis

Table 7: Chronic pelvic pain and endometriosis types

	Chronic Pelvic pain		No chronic pelvic pain	
Endometriosis stage	**No.**	**%**	**No.**	**%**
Superficial peritoneal endometriosis	6	27.2	4	50
Ovarian endometrioma	8	36.4	3	37.5
Deep infiltrating endometriosis (DIE)	8	36.4	1	12i5
Total	22	100	8	100

Table 7: Infertility and endometriosis status

Characteristic	Total, n (%) N=443	Endometriosis, n (%)	No endometriosis, n (%)	OR (95% CI)	P-value
Infertility					
None	240 (54.2)	15 (50.0)	225 (54.5)		
Primary	108 (24.4)	12 (40.0)	96 (32.2)	1	
Secondary	95 (21.4)	3 (10.0)	92 (22.3)	3.8 (1.0-14.0)	0.03
Overall	443 (100.0)	30 (100.0)	413 (100.0)		

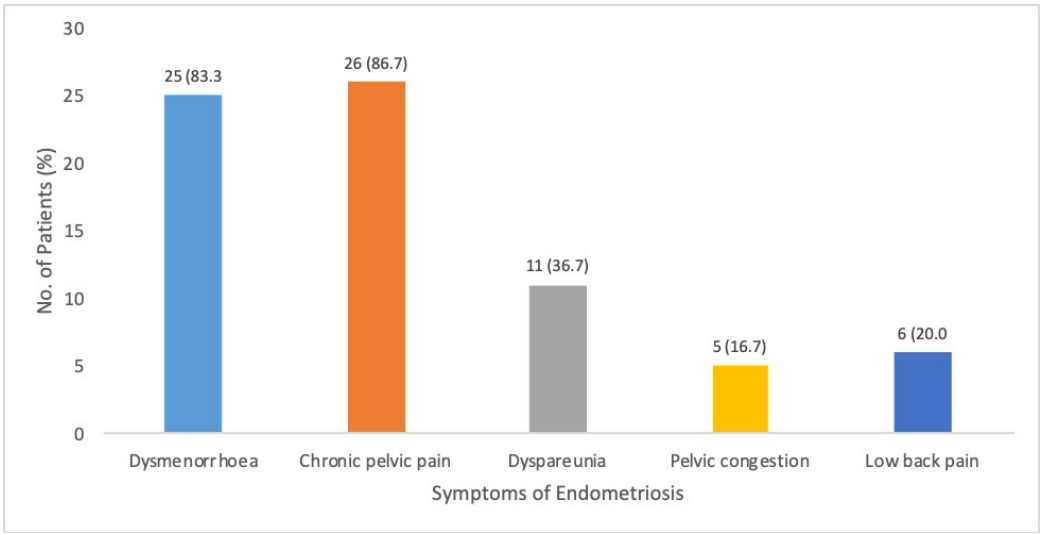

Figure 2: Symptoms of endometriosis

Table 8: Infertility and endometriosis type

	Infertility		No Infertility	
Endometriosis stage	**No.**	**%**	**No.**	**%**
Superficial peritoneal endometriosis	3	20	9	60
Ovarian endometrioma	7	47.7	4	26.7
Deep infiltrating endometriosis	5	33.3	2	13.3
Total	15	100	15	100

Discussion

In this study, the women's mean age was 33 years. Women with endometriosis and those without had no statistically significant difference in their ages. The prevalence of histologically confirmed endometriosis was 6.8%. Single women had a higher probability of having endometriosis (p<0.001), while married and separated women had no predisposition. The status of the women's education and occupation were not significant factors in the occurrence of endometriosis. Nulliparous women had a higher probability (OR=4.1 (1.5-10.2)) of endometriosis diagnosis. There was no correlation between the number of abortions and the manifestation of endometriosis. There was no significant correlation between menorrhagia and endometriosis (p=0.088). Women with the onset of menarche at >13 years had no significant risk of manifesting endometriosis. In contrast, menarche at ≤13 years had a significant risk of suffering from endometriosis (p=0.001). There was no significant relationship between having endometriosis and clinical findings of the retroverted uterus, pelvic mass, or lower abdominal tenderness. However, the localization of nodules in the pouch of Douglas and adnexal tenderness were significantly associated with endometriosis (p<0.001). Women with dyspareunia, chronic pelvic pain (scale 8-10), and dysmenorrhea were more likely to have endometriosis (p<0.001). In women who have endometriosis, those with ovarian endometrioma (47.7%) and deep infiltrating endometriosis (33.0%) had a higher occurrence of infertility than those with superficial peritoneal endometriosis (20.0%), although this was not statistically significant.

This study demonstrated that nulliparous women had a higher probability of suffering from endometriosis, which is comparable with the studies that reported that women with a menstrual cycle of fewer than 27 days and those with uninterrupted prolonged menses have a higher predisposition to the occurrence of endometriosis (12-16). Consistent with this study, women with early menarche have a higher predisposition to developing endometriosis (17). Endometriosis is associated with chronic pelvic pain and dysmenorrhea, negatively impacting women's lifestyles, well-being, education, and productivity (9). In this study, 50% of women with endometriosis had infertility. This is similar to other studies that reported 38.5% and 25-40% of women with laparoscopically diagnosed endometriosis had endometriosis, while only 5.2% and 0.5-5.0% of fertile women had endometriosis (18,19). Besides, infertility is 6-8 times more likely to manifest in women with endometriosis than in infertile ones (20,21). In this study, women with endometriomas and deep infiltrating endometriosis had a high probability of having infertility. This is inconsonant with studies that reported that infertility is more likely to occur in women with advanced stages of endometriosis (22).

Study strengths and limitations

The study's strength was its prospective design and histologically confirmed endometriosis. The study population was limited to laparoscopic gynecological patients, which was highly selective. The histological diagnosis of endometriosis was limited by technical efficiency in endometrial sampling, processing, and reporting. Histopathological examination was done by multiple pathologists, which eliminated bias.

Conclusion

The prevalence of histologically confirmed endometriosis in indigenous Africans was 6.8%. Endometriosis prevalence in Africa is comparable to the worldwide prevalence, and as such, with its morbidity, it warrants close attention. Chronic pelvic pain, dysmenorrhea, and dyspareunia are significant symptoms of endometriosis, and as such, patients with these symptoms should be investigated for endometriosis.

Recommendations

African women, physicians, health workers, and the general public should be sensitized about this disease to promote early presentation, prompt diagnosis, and effective treatment.

Conflict of interests

The authors declare no conflicts of interest.

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