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CLINICAL ARTICLE

Endometriosis and associated symptoms among Nigerian women

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ABSTRACT

Objective: To determine the prevalence of endometriosis and identify associated symptoms among Nigerian women. *Methods:* A cross-sectional study was conducted at a center in Ibadan, Nigeria, between October 2008 and December 2010. All women aged 18–45 years scheduled for their first diagnostic laparoscopy for gynecologic indications were enrolled. Participants completed a previously validated self-administered questionnaire. Endometriosis was diagnosed on the basis of visual evidence. *Results:* Among 239 women analyzed, 115 (48.1%) had endometriotic lesions. Endometriosis was more common among women reporting dysmenorrhea and pelvic pain than among those not reporting these symptoms (20/28 [71.4%] vs 95/211 [45.0%]; $P = 0.009$). Women who reported dysmenorrhea were significantly more likely to have endometriosis than were those without dysmenorrhea (90/171 [52.6%] vs 25/68 [36.8%]; $P = 0.027$). The risk of endometriosis was not significantly increased in women with one pain symptom (odds ratio [OR]1.69; 95% confidence interval [CI] 0.67–4.27), but was significantly increased in women with two (OR 2.70; 95% CI 1.13–6.52) or three (OR 4.87; 95% CI 1.88–12.82) pain symptoms ($\chi^2_{trend} = 15.5$; $P < 0.001$). In a multivariate logistic regression model, only pain other than dysmenorrhea or dyspareunia independently predicted endometriosis ($P = 0.017$). *Conclusion:* Endometriosis is fairly common among Nigerian women. Efforts to increase the awareness of endometriosis among the public, researchers, and clinicians are needed.

1. Introduction

Endometriosis occurs when endometrial tissue is located in sites other than the endometrial lining of the uterus. Although it typically involves pelvic organs, it can also affect extra pelvic structures, such as the chest [1]. Several hypotheses have been proposed, but none can fully explain all types and locations of endometriosis [2]. The symptoms are mainly attributable to the response of endometrial glands (wherever their location) to cyclic hormonal stimulation, with subsequent shedding of endometrial tissue during menstruation; the disorder manifests most often as pelvic pain, dysmenorrhea, dyspareunia, and infertility [3].

Commonly reported risk factors for endometriosis include nulliparity, early menarche, a short cycle length, and an irregular menstrual cycle [4,5]. Underweight women are also at a significantly higher risk of developing endometriosis [6]. A family history of cancer has been less consistently reported as a risk factor [7].

Because surgery is required to confirm the diagnosis, the prevalence of endometriosis in the general population is unknown [3]. Endometriosis is thought to be more prevalent among Asian women than among white women [4]. Endometriosis has been extensively studied among white populations [8,9], but research among African women has been sparse, although the disorder has long been assumed to be uncommon among African women [4,10]. The disease is thought to be associated with affluence; Aimakhu and Osunkoya [10] attributed the low rates among African women to widespread poverty.

Most primary reports on endometriosis among African women have been retrospective reviews of surgical findings (Table 1). In a cross-sectional survey conducted in northern Uganda, Somigliana et al. [16] identified endometriosis on the basis of a history of surgery for endometriosis, or clinical or ultrasonography findings indicative of endometriosis. They found only one case of endometriosis in a cohort of 351 women, giving a prevalence of 0.2% (95% confidence interval [CI] 0.01–0.9%). Kyama et al. [18] conducted a comprehensive review of endometriosis among African women. They concluded that with the increasing pace of globalization, African women are experiencing lifestyle changes and greater economic well-being—factors that promote marriage at a later age, delayed childbearing, and a smaller number of

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Table 1
Primary reports on the prevalence of endometriosis in Africa.

Authors	Year	Study design	Setting	Assessment	Prevalence of endometriosis, %
Ekwempu, Harrison [11]	1979	Retrospective	Northern Nigeria	Review of pelvic operations	8.2
Otolorin et al. [12]	1987	Retrospective	Southwest Nigeria	Laparoscopic evaluation for infertility	1.4
Mboudou et al. [13]	2007	Retrospective	Cameroon	Laparoscopic evaluation for infertility	13.5
Ikechebelu, Mbamara [14]	2011	Retrospective	Southeast Nigeria	Review of diagnostic laparoscopies	4.4
Butt et al. [15]	2012	Retrospective	South Africa	Review of elective hysterectomy	0.9
Somigliana et al. [16]	2012	Cross-sectional	Northern Uganda	Gynecologic consultations	0.2 (95% CI 0.01–0.9)
Alabi et al. [17]	2013	Retrospective	Southwest Nigeria	Laparoscopic evaluation	20.0

Abbreviation: CI, confidence interval.

children. This combination of factors will increase the risk of developing endometriosis, with a consequent rise in its prevalence in Africa.

Most reports on endometriosis in Nigeria have been case reports [19,20], which could support the assumption that the condition is rare. However, two studies from approximately 30 years ago [11,12] indicated that endometriosis could be more common than has been assumed, with reported prevalences of 1.4%–8.2%. Reports from the past decade from Nigeria [17] and elsewhere in Africa [13] indicate that endometriosis could be as prevalent among women of African origin as it is among other populations.

Nigeria participated in the World Endometriosis Research Foundation Global Study of Women's Health, which prospectively recruited symptomatic and asymptomatic women undergoing laparoscopy for the first time. The study collected standardized, comprehensive, and robust epidemiologic information on endometriosis and its associated symptoms with a view to obtaining data about the prevalence, impact, treatment, and risk factors of endometriosis [21–23]. The major objectives of the present secondary analysis were to assess the prevalence of endometriosis among symptomatic Nigerian women and to examine its association with specific symptoms.

2. Materials and methods

As part of the Global Study of Women's Health—an international collaborative multicenter study [23]—a cross-sectional analytical investigation with prospective recruitment was conducted at the gynecologic outpatient clinic at University College Hospital, Ibadan, Nigeria, between October 1, 2008, and December 31, 2010. All women aged between 18 and 45 years who were scheduled for their first diagnostic laparoscopy for a gynecologic indication were eligible for inclusion. Women who were postmenopausal and those with a previous diagnosis of endometriosis on laparoscopy were excluded from the study.

Eligible women, who were identified using the elective laparoscopy list and medical records, were approached to participate in the study. A research nurse provided an information leaflet and counseled all eligible women about the study. Written informed consent was obtained from all study participants. Written informed consent was also obtained for surgery. Ethics approval for the study was obtained from the joint Ethics Committee of the University of Ibadan and the University College Hospital. The patients' contact details were collected to enable future studies.

Before surgery, consenting women were requested to complete the Global Study of Women's Health questionnaire [24], a 67-item questionnaire that includes questions about overall health, medical history, menstrual history and contraception, pelvic pain, obstetric history, and family history.The questions about pelvic pain address the presence and type of pelvic pain, the menstrual pattern, the effect of pain on daily activities, and the history of analgesic treatment. The severity of pain is assessed on a numerical rating scale ranging from 0 to 10 [25]. Respondents with dysmenorrhea are asked to provide the average dysmenorrhea score for the last 3 months and the worst dysmenorrhea score during the last 3 months.

In all women, surgery was performed as a day-case procedure. The laparoscopic view was projected onto a screen and the findings were recorded in a standard manner [26] by members of the research team. Endometriosis was diagnosed on the basis of visual evidence of endometriosis at laparoscopy alone, in keeping with the European Society of Human Reproduction and Embryology (ESHRE) guidelines [3]. It was staged according to the revised American Fertility Society classification [27]. At least two members of the research team attended each laparoscopy session. Training sessions on the identification of endometriosis at laparoscopy were organized periodically during the study period.

The data from the completed questionnaires and the laparoscopic findings were entered into an online data entry system. An onset of menstruation at age 13 years or younger was regarded as early menarche. A woman was considered to have pain associated with bowel symptoms if any pelvic pain was accompanied by a change in bowel movement or stool consistency. A woman was considered to have pain and urinary symptoms if any pelvic pain was accompanied by an increased urinary frequency or by pain before, during or after urination. In addition, the number of pelvic pain symptoms—dysmenorrhea, dyspareunia, and pain other than dysmenorrhea or dyspareunia—was determined.

Data analysis was performed with Epi Info version 3.5.1 (Centers for Disease Control and Prevention, Atlanta, GA, USA). The associations between endometriosis and pain symptoms were explored using the χ^2 and Fisher exact tests as appropriate. The median values for the average and worst pain scoresfor dysmenorrhea in women with and without endometriosis were compared using the independent-sample *t* test. A bivariate analysis was performed for all pain variables, early menarche, spontaneous or induced abortion, analgesic prescription or self-medication for dysmenorrhea, limitation of activities, or having to lie down because of dysmenorrhea. To determine which pain symptoms were predictive of endometriosis, the pain symptoms significantly associated with endometriosis at bivariate analysis were entered into a multivariate regression model. Associations were reported as odds ratios (ORs) and 95% CIs. $P < 0.05$ was considered statistically significant.

3. Results

A total of 245 women consented to participate in the study. Complete data for analysis were available for 239 women. The age of the participants ranged from 18 to 45 years, with a mean age of 32.9 ± 5.6 years. Infertility was the major presenting complaint (208 [87.0%] participants), followed by pelvic pain (25 [10.5%]) (Fig. 1).

Evidence of endometriosis was recorded at laparoscopy for 115 (48.1%) women. Women aged 26–35 years accounted for 77 (66.9%) cases of endometriosis and were significantly more likely to have the disorder than were women in other age groups ($P = 0.006$). Endometriosis was least common among women who were aged 20 years or younger (Table 2).

Table 3 shows the associations between participant characteristics and endometriosis. Early menarche, previous spontaneous or induced abortion, and menorrhagia were not significantly associated with endometriosis. However, women who reported dysmenorrhea were almost twice as likely to have endometriosis as were those who had no dysmenorrhea ($P = 0.027$). Additionally, women who reported having received an analgesic prescription for dysmenorrhea ($P = 0.017$), having

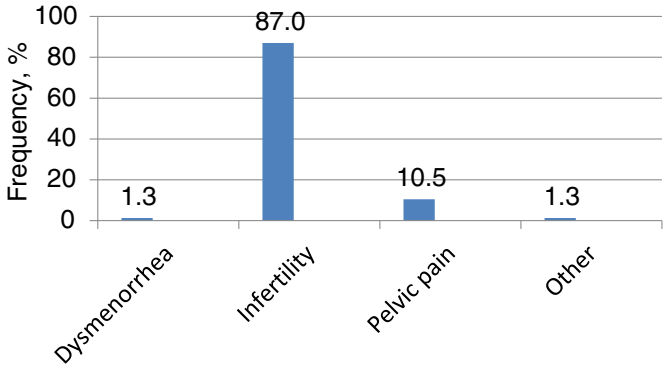

Fig. 1. Major presenting complaint (n = 239).

had to limit their activities because of dysmenorrhea ($P = 0.002$), and having had to lie down because of dysmenorrhea ($P = 0.008$) were also significantly more likely to have endometriosis than were those who did not report these experiences. More than half the women who reported the use of self-medication for dysmenorrhea had endometriosis; however, the difference in endometriosis frequency between those with and without the use of self-medication did not reach statistical significance ($P = 0.625$).

Of the different pain symptoms, dysmenorrhea, dyspareunia, and pain other than dysmenorrhea or dyspareunia were significantly associated with endometriosis (Table 4). Pain associated with bowel or urinary symptoms was not significantly associated with endometriosis.

More women with endometriosis than without this disorder reported always having dysmenorrhea (Fig. 2). The proportion of women with endometriosis reporting dysmenorrhea often or always (61/115 [53.0%]) was significantly higher than that of women who did not have endometriosis (44/124 [35.5%]; $P = 0.006$). The median score for average pain from dysmenorrhea was 4 (range 1–10) among women with endometriosis, compared with 3 (range 1–10) among those without the disorder.The median score for worst pain from dysmenorrhea was 5 (range 1–10) among women with endometriosis, compared with 4 (range 1–10) among those without the disorder. Endometriosis was more common among women reporting dysmenorrhea and pelvic pain than among those not reporting these symptoms (20/28 [71.4%] vs 95/211 [45.0%]; $P = 0.009$).

The risk of endometriosis did not differ between women without any pain symptoms and those who had one pain symptom (OR 1.69; 95% CI 0.67–4.27). However, the risk increased by almost three times when two pain symptoms were present (OR 2.70; 95% CI 1.13–6.52), and by almost five times when a woman had three pain symptoms (OR 4.87; 95% CI 1.88–12.82). This trend was significant ($\chi^2_{trend} = 15.5$; $P < 0.001$).

When the pain symptoms significantly associated with endometriosis in bivariate analysis were entered into the multivariate logistic regression model, only pain other than dysmenorrhea or dyspareunia significantly predicted endometriosis ($P = 0.017$) (Table 5).

Table 2
Age distribution of participants.[a]

Age, y	Total (n = 239)	Women with endometriosis (n = 115)
≤20	5 (2.1)	5 (4.3)
21–25	8 (3.3)	7 (6.1)
26–30	68 (28.5)	32 (27.8)
31–35	85 (35.6)	45 (39.1)
36–40	57 (23.8)	19 (16.5)
>40	16 (6.7)	7 (6.1)

[a] Values are given as number (percentage).

Table 3
Bivariate analysis of associations between endometriosis and participant characteristics.

Characteristic	Endometriosis present[a]	Odds ratio (95% CI)	*P* value
Early menarche[b]			
Yes (n = 85)	40 (47.1)	0.96 (0.55–1.69)	0.886
No (n = 152)	73 (48.0)	Ref.	–
Previous spontaneous abortion			
Yes (n = 42)	19 (45.2)	0.87 (0.42–1.78)	0.681
No (n = 197)	96 (48.7)	Ref.	–
Previous induced abortion			
Yes (n = 105)	44 (41.9)	0.64 (0.38–1.07)	0.089
No (n = 134)	71 (53.0)	Ref.	–
Menorrhagia			
Yes (n = 47)	24 (51.1)	1.16 (0.61–2.19)	0.652
No (n = 192)	91 (47.4)	Ref.	–
Dysmenorrhea			
Yes (n = 171)	90 (52.6)	1.91 (1.07–3.40)	0.027
No (n = 68)	25 (36.8)	Ref.	–
Analgesic prescription for dysmenorrhea			
Yes (n = 51)	34 (66.7)	2.29 (1.15–4.52)	0.017
No (n = 120	56 (46.7)	Ref.	–
Self-medication for dysmenorrhea			
Yes (n = 73)	40 (54.8)	1.16 (0.63–2.14)	0.625
No (n = 98)	50 (51.0)	Ref.	–
Having had to limit activities because of dysmenorrhea			
Yes (n = 52)	34 (65.4)	2.13 (1.08–4.18)	0.002
No (n = 119)	56 (47.1)	Ref.	–
Having had to lie down because of dysmenorrhea			
Yes (n = 86)	54 (62.8)	2.30 (1.24–4.24)	0.008
No (n = 85)	36 (42.4)	Ref.	–

Abbreviations: CI, confidence interval.
[a] Values are given as number (percentage).
[b] When aged <13 years.

4. Discussion

In the present study, 48.1% of women undergoing laparoscopy for gynecologic indications were diagnosed with endometriosis. Women with endometriosis more commonly reported dysmenorrhea and pelvic pain. Given the wrongful assumption that endometriosis is rare among African women, the condition has received very little research attention in Africa. The consequence is a lack of awareness among women, physicians, and society at large. Thus, many women with symptoms such as dysmenorrhea are under the false impression that this is a normal accompaniment of menstruation. Women presenting with pelvic pain are likely to be misdiagnosed and are sometimes stigmatized as having a pelvic infection. As a result, many African women have probably experienced endometriosis without recognition of the problem over the past decades.

Most previous reports on endometriosis in Nigeria have been retrospective reviews of medical records, and the true prevalence of

Table 4
Bivariate analysis of associations between endometriosis and pain.

Type of pain	Endometriosis present[a]	Odds ratio (95% CI)	*P* value
Dysmenorrhea (n = 171)	90 (52.6)	1.91 (1.03–3.55)	0.027
Dysmenorrhea with bowel symptoms (n = 107)	57 (53.3)	1.00 (0.53–1.87)	0.995
Dyspareunia (n = 106)	62 (58.5)	2.13 (1.22–3.70)	0.004
Pain other than dysmenorrhea or dyspareunia (n = 111)	66 (59.5)	2.36 (1.36–4.12)	0.001
Chronic pelvic pain (noncyclical) (n = 43)	24 (55.8)	0.77 (0.33–1.81)	0.512
Pain and bowel symptoms (n = 55)	35 (63.6)	1.46 (0.63–3.37)	0.332
Pain and urinary symptoms (n = 61)	39 (63.9)	1.57 (0.68–3.63)	0.249

Abbreviations: CI, confidence interval.
[a] Values are given as number (percentage).

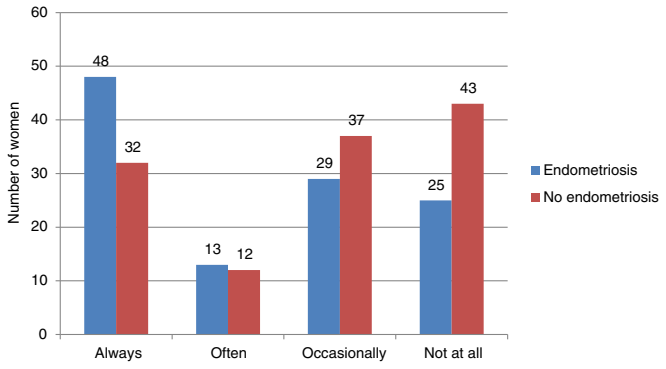

Fig. 2. Association between endometriosis and frequency of dysmenorrhea (n = 239).

endometriosis may thus have been underestimated. The present study had a prospective design and produced high-quality data because it followed the protocol of a multicenter, multicountry study (the Global Study of Women's Health) that was implemented in compliance with ESHRE guidelines [3]. The 48.1% prevalence of endometriosis reported here among symptomatic women is the highest prevalence reported in Africa, the next highest figure being the 20% prevalence reported by Alabi et al. [17].The deliberate search for endometriosis in the present study could explain the high prevalence.

There was a strong association between pelvic pain and endometriosis in the present study. Likewise, Matalliotakis et al. [7] reported the presence of pelvic pain in 79.1%, dysmenorrhea in 70.2%, and dyspareunia in 49.5% of women with endometriosis in the USA. A history of previous abortion (spontaneous or induced) did not appear to be a determinant for endometriosis in the present study.

Endometriosis seems to have a considerable impact on the well-being and productivity of affected women because it was significantly associated with the prescription of analgesics by a physician and with having to lie down because of dysmenorrhea. The tendency for affected women to report severe dysmenorrhea compared with women without endometriosis supports this observation. An analysis of the Global Study of Women's Health [22], which aggregated data from 16 hospitals in 10 countries including Nigeria, revealed that the physical-health-related quality of life was significantly reduced in women with endometriosis, resulting in a loss of work productivity of approximately US$4 per woman per week among affected Nigerian women.

A limitation of the present study is its small sample size. Nevertheless, the findings are important. In future studies in Nigeria, the recruitment of adequate participant numbers could be achieved by forming multicenter collaborative initiatives.

The results from the present study have implications for research and clinical practice in Nigeria. Endometriosis needs to receive increased research attention. The Ibadan Endometriosis Registry was established in the course of this study: all women identified as having endometriosis were added to the registry. The Registry will facilitate tracking of cases. This initiative is expected to stimulate research on the topic in Ibadan. Advocacy is required to sensitize the research community, policy makers, physicians, health administrators, women, and the general public about the condition. Advocacy is also required to create an enabling environment for investment and training in laparoscopy to expand and promote access to early diagnosis. Given that access to laparoscopy across Sub-Saharan Africa is currently limited, the diagnosis and treatment of endometriosis based on symptoms will be a cost-effective approach. Using predictive modeling, Nnoaham et al. [23] showed that menstrual dyschezia (difficulty in defecating), ethnic origin, and a history of benign ovarian cysts were the strongest predictors of endometriosis. However, such findings require validation before application in our environment. Pain associated with bowel symptoms did not significantly predict endometriosis in the present series.

In conclusion, endometriosis is more common than was previously thought in Nigerian women with symptoms indicative of the condition. Urgent actions are needed to sensitize women, physicians, and the general public about this disease with a view to promoting early presentation, prompt diagnosis, and effective treatment.

Table 5
Multivariate regression analysis for type of pain as a predictor of endometriosis (n = 239).

Type of pain	Odds ratio (95% CI)	*P* value
No pain symptoms	Ref.	—
Dysmenorrhea	1.38 (0.75–2.57)	0.303
Dyspareunia	1.71 (0.99–2.96)	0.054
Pain other than dysmenorrhea or dyspareunia	1.95 (1.13–3.37)	0.017

Abbreviations: CI, confidence interval.

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Conflict of interest

The authors have no conflicts of interest.

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