Laparoscopic diagnosis of endometriosis in a low resource setting

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ABSTRACT

Background:

Endometriosis is a female clinical enigmatic entity which is described as the occurrence of the endometrial tissue outside of the endometrial cavity. Endometriosis constitutes a serious health issue due to its high affliction of 10% in reproductive age women with a clinical manifestation of infertility and chronic pelvic pain. Despite of years of monumental research, the aetiology, understanding and standardisation of the management of endometriosis has remained elusive. Globally, the prevalence of endometriosis is explicitly documented in the development countries, however, in black Africa there is scant literature. The current perspective is that African woman is hardly affected by endometriosis. Evaluating and understanding the disease burden of endometriosis in the African Woman is essential.

Objective: To determine the prevalence and clinical presentation pattern of endometriosis in African women.

Methodology:

This was a prospective analytical cross-selection study with a sample size of 224 women from April 2018 to April 2021 in Nairobi hospital in Nairobi city, Kenya. The inclusion criteria was women of at least 18 years to 49 years of age undergoing laparoscopic surgery and willing to participate in the study. The women's' medical history, clinical findings and laparoscopic findings and histological diagnosis were recorded and uploaded into an excel sheet and analysed using Social SPSS version 22.0.

Results: The average age of the 224 women who participated in the study was 33.3 years with no statistical difference between the women suffering from endometriosis and those free of the disease. The prevalence of histological confirmed endometriosis in Africans was 8.9%. Laparoscopic visualization diagnosis had a positive predictive value of 33%. Dyspareunia, Dysmenorrhoea and chronic pelvic pain scale 8-10 were significantly associated of endometriosis ($p<0.001$). Nulliparity was a significant risk of developing endometriosis ($p<0.001$). Women who onset of menarche was 13 years and below had a significant risk of developing endometriosis $p=0.001$. Clinical physical findings of adnexal tenderness and nodules in the pouch of Douglas were significantly related to endometriosis $p<0.001$. Pouch of Douglas was the most common locality of endometriosis implants while the most common category of endometriosis was endometrioma (40%).

Conclusion: The prevalence of endometriosis in the Africa woman was 8.9%. Laparoscopic endometriosis visualization diagnosis had a poor positive predictive value of 50%. Nulliparity, menarche onset at the age of 13 and below, dysmenorrhoea, dyspareunia and chronic pelvic pain scale 8-10 were significantly associated with endometriosis. Pouch of Douglas was the most common locality of endometriosis whilst the most category of endometriosis was endometriomas.

Key words: Endometriosis, Prevalence, laparoscopy, Africa woman

Introduction

Endometriosis is a female clinical enigmatic entity which is described as the occurrence of the endometrial tissue outside of the endometrial cavity, principally in the pelvic peritoneum, ovary and pouch of Douglas. Despite years of research, the aetiology and understanding of the perplexing endometriosis pathology remains elusive.(4). Endometriosis has high prevalence affecting 6%- 10% of women of reproductive age and its symptoms are principally dysmenorrhoea, chronic pelvic pain, dyspareunia and infertility(1). Endometriosis has been observed in 35%-50% of women with chronic pelvic pain and infertility and hence constitutes a serious health issue(2).

There is clear documentation on the disease burden of endometriosis in the developed world, however, in the developing countries there is scanty literature (3). Racial and social economic status characteristics have not been comprehensively addressed in endometriosis. There is paucity of data on prevalence of endometriosis in Black Africa and current perspective is that indigenous African is rarely affected by endometriosis (3) Laparoscopy surgery is the gold standard for the diagnosis of endometriosis and has revolutionized the management of endometriosis, however, it is rarely performed in black Africa (3,5,16). The endometriosis clinical appearance and locality is variable from one woman to another, and its clinical manifestation is divided into 3 categories; superficial peritoneal endometriosis, ovarian endometrioma and deep infiltrating endometriosis (DIE) (7,8,9). There are various forms endometriotic superficial peritoneal as described; classic - blue-black (considered 'diagnostic') and non-classic or subtle-clear or red, white, yellowish brown, like lesions have also been been documented (12,13).

In Nigeria, prevalence of endometriosis was 4.3% and 8.2% in laparotomy and hysterectomy specimen tissue in African women (7, 8). Laparoscopy visualized diagnosed endometriosis without histological authentication was documented to be 48.1% in Ibadan, Nigeria (14). There is current perception that an African-women rarely suffer from endometriosis(4,3). High incidence of pelvic inflammatory disease and early marriage with subsequent multiple pregnancies and breastfeeding have been implicated in the apparent low prevalence of endometriosis in Africans (15). Westernization of lifestyle and change in social economic status of the African woman is likely going to increase the incidence of endometriosis. The apparent low prevalence of endometriosis in black Africa may be due to diagnostic methodology, inadequate training of African gynaecologist and inadequate laparoscopy facilities (3). There are few studies in Africa that have primarily been designed for evaluation of endometriosis with utilization of the laparoscopic visualization with histological confirmation. The understanding of the endometriosis disease burden clinical pattern is essential in the management of the disease in the African woman.

Objective: To determine the prevalence and clinical presentation pattern of endometriosis in African women.

METHOD

The study was analytical cross-selection whose primary outcome was histologically confirmed endometriosis with its clinical presentation in an African woman. The study was undertaken at Nairobi hospital in Nairobi city, Kenya. The study was reviewed and approved by the Kenyan ethical authority with respect to scientific component and adherence to the relevant research and human subjects' statues. The study population was women aged 18-49 years of African descent undergoing laparoscopic surgery. The objectives, benefits and benefits of the study were informed to the respondents and the willing participants gave an informed consent and were enrolled in the study until the calculated sample was attained.

Pre-operative review for the history, clinical presentations and investigation was done to the participants. In this study, Wong /Baker face pain rating scale was used in dysmenorrhoea and chronic pain assessment (17). Examination Under Anaesthesia (EUA) and laparoscopy surgery was performed and the lesions suspected to be endometriosis and anatomical locality noted and subsequently staging of endometriosis was done and the biopsy taken. The endometriosis extent was determined using the revised America Society for reproductive Medicine (Revised ASRM) (11). One to four biopsies were taken from the subtle lesion that might represent endometriosis even if there was no suspicion of

endometriosis. Haematoxylin and eosin was used for staining of the samples for histological confirmation. The structured questionnaire was completed by the principle investigator, all the data verified and double entry into a computer using Microsoft. Access database performed. Social SPSS version 22.0 was used for data analysis. The predictors of endometriosis among women undergoing laparoscopic surgery were determined using chi-square and logistic regression. P value of < 0.05 was considered significant.

Results

Table 1: Socio Demographic Characteristics and Endometriosis Status (n=224) - Private

Characteristics		**Total, n (%)**	**Endometriosis, n (%)**	**No Endometriosis, n (%)**	**OR (95% CI)**	**P-value**
Age						
Mean		33.3	31.4	33.5	-	0.137
Median		30.0	31.0	33.0	-	0.712
Range		[18-46]	[18-46]	[18-45]	-	-
•	≤ 24	16 (7.1)	3 (15.0)	13 (6.4)	1	
•	25 – 29	52 (23.2)	3 (15.0)	49 (24.0)	3.8 (0.7-20.9)	0.109
•	30 – 34	62 (27.7)	7 (35.0)	55 (27.0)	1.8 (0.4-7.9)	0.426
•	≥ 35	94 (39.3)	7 (35.0)	87 (42.6)	2.9 (0.7-12.5)	0.146
Marital Status						
•	Married	186 (83.0)	13 (65.0)	173 (84.8)	1	
•	Separated	6 (2.7)	-	6 (2.9)	-	-
•	Single	32 (14.3)	7 (35.0)	25 (12.3)	0.3 (0.1-0.7)	0.007
•	Windowed	-	-	-	-	-
Occupation						
•	Employed	180 (80.4)	14 (70.0)	166 (81.4)	1	
•	Self-Employed	11 (4.9)	1 (5.0)	10 (4.9)	0.8 (0.1-7.1)	0.875
•	Not-Employed	33 (14.7)	5 (25.0)	28 (13.7)	0.5 (0.2-1.4)	0.172

Table 2: Gynecological History and Endometriosis Status (n=224) - Private

Characteristics	Total, n (%)	Endometriosis, n (%)	No Endometriosis, n (%)	OR (95% CI)	P-value
Parity					
Mean	1	0	1	-	0.004
Median	0	0	0	-	0.015
Range	[0-4]	[0-2]	[0-4]	-	-
• Zero	217	17 (85.0)	110 (53.9)	1	
• One	(56.7)	1 (5.0)	13 (6.4)	2.0 (0.2-16.5)	0.506
• Two	14 (6.3)	2 (10.0)	34 (16.7)	2.6 (0.6-11.9)	0.196
• ≥ Three	36 (16.1)	-	47 (23.0)	-	-
	47 (21.0)				
No. of Abortions					
Mean	0	0	0	-	0.942
Median	0	0	0	-	0.896
Range	[0-4]	[0-1]	[0-4]	-	-
• None	198	17 (85.0)	181 (88.7)	1	
• 1 - 3	(88.4)	3 (15.0)	22 (10.8)	0.7 (0.2-2.5)	0.573
• 4+	25(11.2)	-	1 (0.5)	-	-
	1 (0.4)				
Age at Menarche (Yrs.)					
Mean	12.9	12.4	13	-	0.021
Median	13.0	12.5	13	-	0.218
Range	[11-21]	[11-14]	[11-21]	-	
• 10-21	66 (29.5)	10 (50.0)	56 (27.5)	1	
• 13-15	156	10 (50.0)	146 (71.6)	2.6 (1.0-6.6)	0.038
• 16+	(69.6)	-	4 (1.0)	-	
	2 (0.9)				
Duration of Flow					
Mean	6	6	6	-	0.911
Median	5	6	5	-	0.782
Range	[0-10]	[4-10]	[0-10]	-	-
• 0-3	8 (3.6)	0	30 (7.3)	-	
• 4-7	169(75.4)	18 (90.0)	151 (74.0)	1	-
• 8+	59 (21.0)	2 (10.0)	45 (22.1)	2.7 (0.6-12.0)	0.181
Menorrhea	59 (26.3)	2 (10.0)	57 (27.9)	0.3 (0.1-1.3)	0.082
Dysmenorrhea	164 (26.8)	15 (75.0)	45 (22.1)	16.6 (3.7-30.7)	<0.001

Table 3: Physical Examination and Endometriosis Status (n=224) - Private

Characteristics	Total, n (%)	Endometriosis, n (%)	No Endometriosis, n (%)	OR (95% CI)	P-value
Lower Abdominal Tenderness	61 (27.2)	8 (40.0)	53 (26.0)	1.9 (0.7-4.9)	0.179
Pelvic Mass	68 (30.4)	2 (10.0)	66 (32.4)	0.2 (0.1-1.0)	0.038
Adnexal Mass	53 (23.7)	6 (30.0)	47 (23.0)	1.4 (0.5-3.9)	0.484
Adnexal Mass Tenderness	50 (22.3)	12 (60.0)	38 (18.6)	6.6 (2.5-17.1)	<0.001
Extroverted Uterus	18 (8.0)	2 (10.0)	16 (7.8)	1.3 (0.3-6.1)	0.735
Nodules P.O.D	3 (1.3)	1 (5.0)	2 (1.0)	1.0 (0.5-1.9)	0.989
Normal Findings	63 (28.1)	6 (30.0)	57 (27.9)	1.1 (0.4-3.0)	0.845

Table 4: Laparoscopic Findings vs Endometriosis Status (n=224) - Private

Characteristics	n	%
Endometriosis	30	
Ovarian Mass/Cyst	37	
Features of Pelvic Inflammatory Disease	38	
Non-Specific Pelvic Adhesions	53	
Appendicitis	3	
Myoma	36	
Pelvic Abscess	5	
Translocated IUD	6	
Hydrosalpinx	11	
Congenital Anomaly	4	

Table 5: Sign of endometriosis

Signs of Endometriosis	n	%
Puckered blue-black	6	20.0
Powder-burned appearance	10	33.3
Subtle (Popular, Glandular, vesicular)	3	10.0
Haemorrhagic (Red vesicular or Flame-like)	8	26.7
Fibrotic lesions (White to black pigmented).	9	30.0
Chocolate cyst/endometrioma.	8	26.7
Deep Infiltrating Endometriosis	8	26.7
Extra pelvic	2	6.7

Table 6: Signs of *Endometriosis (n=20)*

	n	%
Anatomic site of endometriosis		
Anterior uterine	2	6.7
Extra pelvic site	1	3.3
Gut	1	3.3
One or both ovaries	2	6.7
Posterior uterine	2	6.7
Pouch of Douglas	9	30.0
Ultero-sacral ligaments	6	20.0
Unilateral ovary	7	23.3

Table 7: Histological finding on biopsy n=224

		n	%
Histological findings on biopsy tissue		4	1.8
	Adenomyosis	4	1.8
	Appendicitis	2	0.9
	Cervical dysplasia	1	0.5
	Confirmed histological endometriosis	20	8.9
	Ectopic pregnancy	1	0.5
	Endometrial hyperplasia	1	0.5
	Fallopian tubes	11	4.9
	Myoma	22	10.8
	No pathology	143	63.8
	Ovarian cyst	22	10.8
	Ovarian malignancy	2	0.9
	Teratoma	2	0.9

Table 8: Symptoms vs Endometriosis Status (n=224)

Characteristics	**Total, n (%)**	**Endometriosis, n (%)**	**No Endometriosis, n (%)**	**OR (95% CI)**	**P-value**
Dysmenorrhea	47 (21.4)	12 (83.3)	35 (16.9)	24.5 (9.1-66.2)	<0.001
Chronic Pelvic Pain	71 (34.3)	13 (86.7)	63 (30.5)	14.8 (5.1-43.3)	<0.001
Scale of Pain					
• ***0***	3 (4.0)	0	3 (4.8)		
• ***1 – 3***	34 (45.3)	2 (19.2)	32(50.8)	1	
• ***4 – 7***	29 (38.7)	4 (34.6)	25(39.5)	0.4 (0.1-1.4)	0.146
• ***8 - 10***	9 (12.0)	6 (46.2)	3 (4.8)	0.01 (0.0-0.2)	<0.001
Dyspareunia	24 (11.7)	5 (36.7)	20 (9.9)	5.3 (2.3-11.8)	<0.001
Pelvic Congestion	33 (15.1)	2 (16.7)	31 (15.0)	1.1 (0.4-3.1)	0.807
Low Back Pain	30 (13.8)	3(20.0)	27 (13.3)	1.6 (0.6-4.2)	0.306

Table 9: Laparoscopic procedure n=224

Surgical Procedure		
	n	**%**
Excision of Endometriotic Tissue	20	8.6
Diagnostic Laparoscopy	36	16.1
Adhesionlysis	16	7.1
Ovarian Cystectomy	32	14.3
Oophorectomy	2	.9
Myomectomy	37	16.5
Tuboplasty	16	7.1
Salpingectomy	12	5.4
Retrieval of IUD	2	.9
Bilateral Tubal	9	3.1
Drainage of Abscess	1	.4
Hysterectomy	38	17.0
Appendectomy	1	.4

Table 10: Infertility vs Endometriosis Status (224)

Characteristics	Total, n (%)	Endometriosis, n (%)	No Endometriosis, n (%)	OR (95% CI)	P-value
Infertility					
• None	60 (54.2)	8 (50.0)	56 (54.5)		
• Primary	27 (24.4)	8(40.0)	24 (32.2)	1	
• Secondary	25 (21.4)	4 (10.0)	2 (22.3)	3.8 (1.0-14.0)	0.031
Overall,	104 (100.0)	20 (100.0)	100 (100.0)		

Table 11: Chronic pelvic pain and stage of Endometriosis

	Chronic Pelvic pain		No chronic pelvic pain	
Stage of endometriosis	**No.**	**%**	**No.**	**%**
Superficial	**2**	**30.0%**	**2**	**100.0**
Ovarian Endometrioma	**6**	**50.0%**	**2**	
Deep Infiltrating endometriosis	**6**	**20.0%**	**2**	
Total	**14**		**6**	

Table 12: Infertility and Stage of Endometriosis.

	Infertility		No Infertility	
	No.	**%**	**No.**	**%**
Stage of endometriosis				
Superficial	**0**	**0**	**4**	**50.0%**
Ovarian Endometrioma	**6**	**50.0%**	**2**	**25.0%**
Deep Infiltrating endometriosis	**6**	**50.0%**	**2**	**25.0%**
Total	**12**		**8**	

Table 13: Histological findings

	NO	%
1. Confirmed histological endometriosis	20	8.9
2. **Clinical endometriosis but histologically no endometriosis**	47	23.0

Discussion

The patients' mean age in study was 33.3 years and no statistical difference was found between the patients with and those without endometriosis. Women who were single were significantly likely to have endometriosis ($p<0.001$) than separated and married women. The women's education level and occupation were not a factor in occurrence of endometriosis.

The histological confirmed endometriosis had a prevalence of 8.9%, no pathology was detected in 44.2% of the patients and the most common pathology was myoma (19.9%). Laparoscopic visually diagnosed endometriosis was 30 and out of the samples taken from this, 20 were histological confirmed as endometriosis. Laparoscopic endometriosis diagnosis by visualization in this study has a poor positive predictive value of 30%. This study concurs with the assertion that the prevalence of endometriosis is about 10% in the women of reproductive age (18). The prevalence of endometriosis in this study is higher than the Nigerian studies which found a prevalence of 8.2% and 4.3% respectively from laparotomy and hysterectomy specimen. (12,15). In another study in Nigerian, the prevalence of endometriosis by visualization without histology confirmation was documented as 48.8%; this was not consisted with this study (14). Chapmans in his study on African American women on laparoscopic visualization with histological confirmation of endometriosis found a prevalence of 21% in women with pelvic inflammatory disease which was way high compared to this study (19)

Nodules in the pouch of Douglas and adnexal tenderness were significant findings in relation to endometriosis ($p<0.001$), however, pelvic masses, pelvic tenderness and extroverted uterus were not found to be related to endometriosis.

Nulliparity was a significant risk factor of having endometriosis ($p<0.001$). Uninterrupted prolonged menstruation like in nulliparity or in women with menorrhagia or shortened menstrual cycles of less than 27 days are associated with the development of endometriosis (20,21). The occurrence of endometriosis was not influenced by the number of miscarriages and the menstrual flow duration. However, literature indicates that prolonged menstruation and short menstrual cycles are significant risk factors in the endometriosis development (22,23,24).

Dyspareunia, dysmenorrhoea and Chronic pelvic pain scale 8-10 were significant symptomatology of endometriosis ($p<0.001$). Chronic pelvic pain and dysmenorrhoea have been related to increased risk of development of endometriosis (25). Menorrhagia had no significant association with endometriosis in this study ($p=0.088$).

Women who achieved menarche at 13 years or below were significantly at risk of developing endometriosis ($p=0.001$) than those who achieved menarche above 13 years of age. A positive correlation between early menarche and endometriosis has been documented (26).

Women with a diagnosis of endometriosis had infertility prevalence of 60%, whilst those without endometriosis had infertility prevalence of 32% however, there was no association between endometriosis and infertility (p=0.031). In 2 studies, the occurrence of infertility in women with endometriosis was determined to be 38.5% and 25-40% respectively (27,28). Literature, have indicated occurrence of 5-50% of infertility in women with endometriosis; furthermore, infertility is 6-8 times more likely to manifest in endometriosis than in women who are fertile. (29,30). Women in this study with deep infiltrating endometriosis and ovarian endometrioma are more likely to suffer from infertility than those with superficial endometriosis, however, this was not statistically significant. This study findings are in congruent with the literature which indicates that infertility in women with endometriosis is more prevalent in the advanced stages of the disease (15).

Endometriosis implants were located in the Pouch of Douglas (30%), Unilateral ovaries (10%), uterosacral (20%), posterior uterus (30%), bilateral ovaries (10%), anterior uterus (19%), gut (10%) and extra pelvic site (10%). These findings are in concordance with the observation that endometriosis is more frequently located on tissues next to the fallopian tube ostia, which are the pouch of Douglas, utero-sacral ligaments and the ovaries, giving credence to the retrograde menstruation hypothesis (27). An observation has been made that endometriosis implants in African American are more likely to be located posteriorly than anteriorly(31).

The prevalence of the categories of histological confirmed endometriosis were ovarian endometrioma (40%) superficial endometriosis (30%), and deep infiltrating endometriosis (30%). The various form of presentation of superficial endometriosis were powder blue-burned appearance (30%), haemorrhagic (30%) fibrotic lesions (30%), puckered blue-black (20%), and subtle (10%).

Conclusion

The prevalence of histological confirmed endometriosis for this study among the Africans was 8.9%. Diagnosis of endometriosis through laparoscopic visualization had a poor positive predictive value of 30 %. Dyspareunia, dysmenorrhoea and chronic pelvic pain scale 8-10 were significantly related to the development of endometriosis. Nulliparity and women who had menarche at age of 13 years and below had a significant risk of developing endometriosis. The majority category of the histological confirmed endometriosis were ovarian endometrioma and the most common site was pouch of Douglas.

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