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Original Research Article

Frequency of endometriosis among infertile women and association of clinical presentations with laparoscopic findings in center for assisted reproduction, BIRDEM

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ABSTRACT

Background: Endometriosis is a significant cause of infertility, particularly among women of reproductive age. It often presents with symptoms such as pelvic pain, dysmenorrhoea, and dyspareunia. Laparoscopy is still the gold standard for diagnosing and staging endometriosis. This study aimed to determine the frequency of endometriosis among infertile women undergoing diagnostic laparoscopy and to assess the association of clinical symptoms with disease severity.
Methods: A cross-sectional descriptive study was conducted at the Center for Assisted Reproduction (CARE), BIRDEM General Hospital, Dhaka, Bangladesh, from July 2013 to June 2015. A total of 127 infertile women, both primary and secondary, undergoing diagnostic laparoscopy and dye test were enrolled. Data were analyzed using SPSS version 20, with a p-value <0.05 considered statistically significant.
Results: Endometriosis was detected in 18.9% of participants. The mean age was 29.31±4.08 years. Most women had normal (36.22%) or overweight (34.65%) BMI. Secondary infertility was more common (71.65%), but endometriosis was significantly associated with primary infertility (p=0.004). Clinical symptoms, including severe dysmenorrhoea, chronic pelvic pain, and dyspareunia, were significantly associated with endometriosis (p<0.05). Stage II endometriosis was significantly linked with chronic pelvic pain and moderate to severe dysmenorrhoea (p=0.002, 0.004), while stage IV was associated with severe dysmenorrhoea, menorrhagia, and dyspareunia (p=0.016, 0.004, 0.010, respectively). Menorrhagia had an inverse association with endometriosis overall.
Conclusions: Endometriosis is more frequently associated with primary infertility and specific pelvic symptoms, particularly at advanced stages. Laparoscopy remains essential for accurate diagnosis and staging.

Keywords: Chronic pelvic pain, Dysmenorrhoea, Endometriosis, Infertility, Laparoscopy

INTRODUCTION

Endometriosis is an enigmatic disorder affecting women of reproductive age with diverse presentations including pelvic pain, dysmenorrhoea, dyspareunia or subfertility.[1] Prevalence in the general population is difficult to determine. It affects approximately 33% of women with chronic pelvic pain and 10% of adolescents and young adults with severe dysmenorrhoea, estimated by laparoscopic visualization.[2,3] Over two decades, there has been a large increase in infertile patients found to have endometriosis. Whether this represents an increase or reflects more frequent use of laparoscopy is uncertain.

However, the frequency of endometriosis in women with infertility varies between 20% and 50%.[4,5]

The relationship between endometriosis and infertility remains controversial. One study suggests endometriosis alone affects fertility where no other cause exists.[6] The mechanism by which minimal endometriosis affects fertility is uncertain. Moderate to severe endometriosis likely causes infertility through adhesions disrupting the normal anatomical relationship between the fallopian tubes and ovaries. Severe dyspareunia and pelvic pain preventing regular intercourse may affect fertility.[7] Besides causing personal discomfort and complaints affecting young women, endometriosis adds an economic burden through surgical diagnosis and infertility management.[8] It causes psychological stress on both the woman and the male partner.[9,10] Women can be asymptomatic or crippled by pelvic pain and infertility.

The traditional signs of growing dyspareunia, infertility, increased dysmenorrhea, and nodules in the pouch of Douglas do not provide a definitive clinical diagnosis. Ultrasound supports clinical diagnosis of endometrioma but has limited value for determining the extent of endometriosis, lacking resolution for visualizing adhesions and superficial implants. When sonographic signs suggest endometriomas, moderate to severe endometriosis is likely present. Transvaginal ultrasound helps diagnose or exclude ovarian endometrioma.[11] Laparoscopic visual inspection is the gold standard investigation for definitive diagnosis.[12] Laparoscopy allows simultaneous diagnosis and treatment. Endometriosis can be treated medically and surgically by laparoscopy and laparotomy. Medical hormone treatment has no role in treating endometriosis with infertility, as hormonal treatment suppressing endometriosis is contraceptive and doesn't improve the pregnancy rate. A large randomized trial showed laparoscopic ablation of minimal to mild endometriosis increased pregnancy rate.[13]

The goal of current treatment for infertility linked to endometriosis is to restore normal vaginal anatomy and remove ectopic endometrial implants to increase fecundity. Endometriosis surgery can be used for both diagnosis and treatment. Laparoscopic surgery is preferred to laparotomy; it is cost-effective, with quicker recovery time, shorter hospital stay, reduced stress, effective treatment of endometrioma and pain relief.[14] Since 1922, various classifications of endometriosis have been proposed. In the early 1900s, the classification was descriptive. Huffman, in 1951, first recommended treatment according to disease stages. For uniformity in practice, the American Fertility Society (AFS) proposed its first classification in 1979. Due to inadequacies in staging adhesions and deep endometriosis, it was revised in 1985.[15] The revised AFS showed a weak relationship between endometriosis severity and pregnancy outcome. The AFS scoring system is widely used but doesn't reflect symptom severity accurately, predict disease progression, recurrence rate or fertility outcomes in women with endometriosis.[16,17] Yet, it remains essential for classifying the anatomical extent of disease. Any association between this system and clinical or demographic variables can benefit physicians treating subfertility. Endometriosis was found to be 24% common in infertile women in a two-year research study including 50 patients from a tertiary facility in Pakistan. A strong association of pelvic pain and dyspareunia with laparoscopic staging was observed.[18]

Data regarding endometriosis epidemiology in Bangladesh is scarce, and cases are underreported. Given the current burden of endometriosis, diagnostic challenges and limited local data, the study aimed to determine endometriosis frequency in women undergoing diagnostic laparoscopy for infertility evaluation and establish the association between clinical presentations and disease severity diagnosed via laparoscopy.

Objective

The objective of this study was to determine the frequency of endometriosis in women who will undergo diagnostic laparoscopy for evaluation of infertility and to establish the association of clinical presentations with the severity of endometriosis on laparoscopy.

METHODS

This was a cross-sectional descriptive study conducted at the Center for Assisted Reproduction (CARE), Department of Obstetrics and Gynaecology, BIRDEM General Hospital, Dhaka, Bangladesh, over two years from July 2013 to June 2015. The study population included 127 consecutive infertile women who were selected for diagnostic laparoscopy. All eligible participants were recruited conveniently based on their scheduled laparoscopic evaluation for infertility.

Inclusion criteria

Female patients with primary or secondary infertility undergoing diagnostic laparoscopy for evaluation at CARE, BIRDEM. Age range: 20 to 40 years.

Exclusion criteria

Infertility caused solely by male factor. Patients with severe medical disorders (e.g., advanced cardiac disease) are contraindicated for anaesthesia. Infertility due to chromosomal abnormalities or primary amenorrhea.

Data collection procedure

After obtaining informed written consent, detailed information was collected from each participant using a pre-designed data collection form. A complete clinical history and thorough physical examination were performed. Laparoscopic evaluation was then carried out, and findings were recorded. Endometriosis was diagnosed visually during laparoscopy, and the severity of the disease

was classified using the Revised American Fertility Society (rAFS) scoring system, which categorizes the disease into four stages:

Stage I (Minimal): Few superficial implants, commonly in the cul-de-sac.

Stage II (Mild): More implants and possible ovarian involvement.

Stage III (Moderate): Multiple implants and ovarian involvement with mild adhesions.

Stage IV (Severe): Widespread implants, large endometriomas, and dense adhesions.

Study procedure

Each patient underwent diagnostic laparoscopy as part of their infertility workup. During the procedure, findings such as endometrial implants, ovarian endometriomas, pelvic adhesions, and tubal patency were carefully documented. The staging of endometriosis was performed intraoperatively using Raff's criteria. The surgical observations were recorded systematically and used for further analysis. Additional demographic and clinical data such as age, body mass index (BMI), type of infertility, and presenting symptoms (e.g., dysmenorrhea, menorrhagia, dyspareunia, chronic pelvic pain) were also documented.

Ethical consideration

Ethical approval for the study was obtained from the Ethical Review Committee of BADAS. Informed verbal and written consent were secured from each participant after explaining the purpose, methods, and potential risks of the study. Confidentiality was strictly maintained throughout the study. Participants were assured of their right to withdraw at any stage without any impact on their treatment.

Statistical analysis

All collected data were checked, cleaned, and entered into SPSS software version 20 for statistical analysis. Descriptive statistics were used to summarize demographic and clinical variables using means, standard deviations, frequencies, and percentages. Inferential statistical tests, such as the Chi-square test and the t-test, were applied to explore associations between endometriosis and various clinical variables. A p-value <0.05 was considered statistically significant. Results were presented in tables and figures with appropriate legends and numbering.

RESULTS

Table 1 presents the baseline characteristics of the respondents. The mean age of the study participants was 29.31±4.08 years, indicating that most women were within the reproductive age group. In terms of body mass index (BMI), the majority of women had either normal weight (36.22%) or were overweight (34.65%), while a smaller proportion were obese (24.41%) or underweight (4.72%). Regarding the type of infertility, secondary infertility was more prevalent, observed in 71.65% of cases, whereas 28.35% of women presented with primary infertility.

Table 1: Baseline characteristics of the respondents (n=127).

Characteristics		Frequency (N)	Percentage (%)
Mean age (years)		29.31± 4.08	
BMI	**Under weight**	6	4.72
	Normal	46	36.22
	Over weight	44	34.65
	Obese	31	24.41
Type of infertility	**Primary infertility**	36	28.35
	Secondary infertility	91	71.65

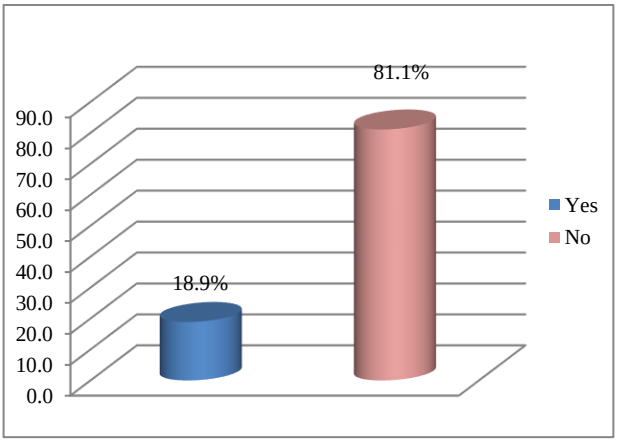

Figure 1: Frequency of endometriosis among the respondents based on laparoscopic evidence (n=127).

Figure 1 shows the frequency of endometriosis among the respondents. Of these, 24 (18.9%) women had endometriosis based on laparoscopic evidence.

Table 2: Association of endometriosis with type of infertility (n=24).

Endometriosis	Type of infertility		P value
	Primary	**Secondary**	
Yes	95.80%	4.20%	0.004
No	67.00%	33.00%	

Table 2 shows that among the respondents with endometriosis, 95.8% suffered from primary infertility and only 4.2% from secondary infertility. Statistically significant association was found between endometriosis and primary infertility (p=0.004).

Table 3 shows that a significant association was found between the presence of endometriosis on laparoscopy and dysmenorrhoea, chronic pelvic pain and dyspareunia (p <0.05). Still, an inverse relation was found between menorrhagia and endometriosis.

The association between clinical presentations of endometriosis and staging (severity of the endometriosis) via diagnostic laparoscopy is summarized in Table 4. Statistically significant association was found between moderate to severe dysmenorrhoea and mild (stage II) and severe (stage IV) endometriosis (p=0.004, 0.016). Significant association also found between menorrhagia and dyspareunia with stage IV (severe) endometriosis (p=0.004, 0.100) and chronic pelvic pain with mild (stage II) endometriosis (p=0.002). However, no statistical association was noted between clinical presentations and other stages of endometriosis.

Table 3: Association of different clinical presentations with the presence and absence of endometriosis (n=127).

Clinical symptoms		Endometriosis		P value
		Yes	No	
Dysmenorr-hoea	Mild	12.50%	87.50%	<0.05
	Moderate	15.80%	84.20%	
	Severe	61.10%	38.90%	
Menorrhagia		30.00%	70.00%	<0.05
Chronic pelvic pain		68.20%	31.80%	<0.05
Dyspareunia		56.00%	44.00%	<0.05

Table 4: Association of clinical presentations and laparoscopic staging of endometriosis.

Staging of endometriosis		Clinical presentation			P value
		Mild	Moderate	Severe	
Dysmenorrhoea	Stage I	2 (6.3%)	2 (5.3%)	4 (22.2%)	0.053
	Stage II	1 (3.1%)	0	3 (16.7%)	0.004
	Stage III	1 (3.1%)	0	1 (5.6%)	0.556
	Stage IV	0	4 (10.5%)	3 (16.7%)	0.016
Total		4 (12.5%)	6 (15.8%)	11 (61.2%)	
Menorrhagia	Stage I	7 (11.7%)			0.057
	Stage II	2 (3.3%)			0.991
	Stage III	2 (3.3%)			0.991
	Stage IV	7 (11.7%)			0.004
Total		18 (30%)			
Dyspareunia	Stage I	8 (32%)			0.085
	Stage II	2 (8%)			0.121
	Stage III	0			
	Stage IV	4 (16%)			0.01
Total		14 (56%)			
Chronic pelvic pain	Stage I	6 (27.3%)			0
	Stage II	3 (13.6%)			0.002
	Stage III	1 (4.5%)			0.68
	Stage IV	5 (22.7%)			0
Total		15 (68.1%)			

DISCUSSION

Endometriosis's inconsistent presentation, expensive diagnosis, and care make it a challenging clinical issue. It is not possible to ascertain the actual prevalence of endometriosis in the general population because it is not feasible to perform surgery on the asymptomatic general population. This observational study was carried out with the aim of determining the frequency of endometriosis in women who underwent diagnostic laparoscopy for evaluation of infertility and to establish the association of clinical presentations with the severity of endometriosis made via laparoscopy.

In this study the mean age of the patients was 29.31±4.08 years at presentation, the low incidence of the disease on either extreme of ages and higher prevalence of endometriosis in women of reproductive age is also in accordance with other studies such as in a multicentric Italian study about prevalence and anatomical distribution of endometriosis in women with selected gynecological conditions by Gruppo found mean age of the women was 31 years at presentation.[19] Still, several other studies revealed that incidence of endometriosis increases with

age such as Farquher CM and L Shahu found that most of the patients of their studies were within the age group of 35-40 years.[5,20]

The present study found the frequency of endometriosis in infertile patients to be 18.9%, which is consistent with findings of various other studies done all over the globe. Farquher (2000) found that the prevalence of endometriosis among infertile women ranges from 20% to 30%.[5] Matthew LM and Hughs Taylor (2012) stated in a review of pathogenesis and treatment of endometriosis-associated infertility that infertility is dramatically increasing in women with endometriosis and found that the prevalence of endometriosis among infertile women was 25 to 50%.[21] The present study findings were also compared with a study done by Khawaza et al (2009) in Pakistan, where the frequency of endometriosis among infertile women was 16.8%.[22] However, another study by Mehmud et al (2007) found that the frequency of endometriosis among infertile women was 24%.[18]

In this study, nearly three-fourths (72%) of the study cases presented with primary infertility and only a quarter (28%) with secondary infertility, a finding similar to other descriptive studies.[23] This study also revealed a strong statistical association between primary infertility and endometriosis, as most of the patients with primary infertility were found to have endometriosis on the basis of laparoscopic evidence. This finding also comparable with the study done by Khawaza et al in Pakistan.[22] In another study, "Laparoscopic management of endometriosis in infertile women and outcome" by L Shahu revealed that most (84.6%) cases underwent laparoscopy for diagnosis and management presented with primary infertility.[20]

In our study 36% patients had normal body mass index (BMI) and among them 11.8% of patients had endometriosis. This study revealed that patients with stage IV (severe) endometriosis have a lower mean BMI than patients without stage IV endometriosis, and a statistically significant association was found between severe endometriosis and BMI ($p<0.05$). Recently, an Association between presence of endometriosis and a low body mass index (BMI)' was done by European and western studies and suggested a positive association between low body mass index with endometriosis.[24,25] A significant association was found between low BMI with laparoscopic staging of endometriosis in a study among 796 infertile women undergoing diagnostic laparoscopy by Khawaja et al (2009), this difference with present study may be due to large number of study population included in their study.[22]

A significant number of patients in addition to infertility had other signs and symptoms consistent with endometriosis which included dysmenorrhoea, menorrhagia, chronic pelvic pain and dyspareunia. This suggests that the patient coming to the clinic with infertility, with added symptoms, can prove a good guide to the diagnosis of endometriosis. In the present study, a statistically significant association was found between dysmenorrhoea and chronic pelvic pain with mild endometriosis ($p<0.05$). According to Vercellini et al. (2007), dysmenorrhea is the most common symptom that endometriosis patients report, and it has been randomly linked to early mild endometriosis.[26] Another study by Mehmud and Sadia found a strong correlation between dysmenorrhea and chronic pelvic pain with mild endometriosis.[18] This present study also revealed significant association between menorrhagia, chronic pelvic pain and dyspareunia with stage IV (severe) endometriosis diagnosed via laparoscopy ($p=<0.05$) several other investigators like Vercellini et al (1996), Porpora et al (1999) observed strong association between deep posterior cul de sac lesions and dyspareunia.[27,28]

Endometriosis is more prevalent among infertile women than in the general population. Since reliable non-invasive diagnostic tools are lacking, laparoscopy remains the gold standard for both diagnosis and staging. It provides direct visualization of disease extent and helps guide treatment options. However, as emphasized by multiple studies, laparoscopic stage does not reliably correlate with symptom severity or fertility potential some patients with minimal disease experience debilitating symptoms. In contrast, others with extensive disease may be asymptomatic.

Limitations and recommendations

This study was limited by its single-center design, small sample size due to time constraints, and reliance on laparoscopy, which is invasive, costly, and requires surgical expertise. These factors limit the generalizability and scope of the findings. Future research should be multicentric, prospective, and involve larger samples. A multidisciplinary approach is essential for a better understanding and diagnosis of endometriosis. Laparoscopy facilities should be available in all tertiary hospitals, and infertile women should be educated to seek early consultation and undergo a timely diagnostic laparoscopy.

CONCLUSION

Laparoscopy remains the cornerstone for diagnosing and staging endometriosis in infertile women, especially when clinical signs are inconclusive and imaging tools have limitations. A comprehensive evaluation combining clinical assessment with laparoscopic confirmation allows for more accurate diagnosis and informed treatment decisions. Ensuring access to laparoscopy and raising awareness among healthcare providers and patients about early evaluation can improve reproductive outcomes. Continued research and a multidisciplinary approach are essential for advancing the understanding and management of endometriosis in the context of infertility.

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