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Original Research Article

Non-surgical Therapeutic Strategies for Endometriosis: Associated Pelvic Pain

Akshita Vishwakarma

Postgraduate (3rd Year), Department of Obstetrics and Gynecology, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India

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Corresponding Author: Dr. Akshita Vishwakarma
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Abstract:

Background: Endometriosis is a chronic, estrogen-dependent gynecological disorder characterised by ectopic endometrial-like tissue outside the uterine cavity, and is frequently associated with debilitating pelvic pain, dysmenorrhea and dyspareunia. While surgical excision remains a key component of management, non-surgical medical and conservative therapies play a central role, particularly in patients not opting for or suitable for surgery. Current guideline recommendations favour hormonal suppression (combined oral contraceptives, progestins, GnRH agonists/antagonists) as first-line non-surgical options. Nevertheless, there remains limited real-world data from low-resource settings, such as Bihar, on the effectiveness of non-surgical approaches in endometriosis-associated pelvic pain. This study aims to evaluate the outcomes of non-surgical treatment modalities in a cohort of 30 patients with endometriosis-associated pelvic pain over a six-month period at Darbhanga Medical College and Hospital, Darbhanga, Bihar.

Materials and Methods: This observational study was conducted over a six-month period at Darbhanga Medical College and Hospital, Darbhanga, Bihar. A total of 30 consecutive women aged 18–45 years, clinically and/or sonographically diagnosed with endometriosis and presenting with moderate to severe pelvic pain (Visual Analogue Scale (VAS) ≥ 4) were enrolled. Exclusion criteria included prior pelvic surgery for endometriosis, current pregnancy, and contraindications to hormonal therapy. Patients received non-surgical treatment according to a standard protocol: (a) combined oral contraceptive pill or progestin therapy, (b) non-steroidal anti-inflammatory drugs (NSAIDs) as required, (c) adjunctive conservative measures including pelvic-floor physiotherapy and lifestyle counselling. Pain intensity (VAS), functional status (Pelvic Pain Impact Questionnaire) and quality of life (Endometriosis Health Profile-30) were assessed at baseline, 3-months and 6-months. Data were analysed using paired t-tests and repeated-measures ANOVA; a p-value < 0.05 was considered statistically significant.

Results: Of the 30 patients enrolled, 28 completed the six-month follow-up. Mean baseline VAS pain was 6.8 ± 1.2, which reduced to 4.3 ± 1.1 at 3 months and 3.5 ± 1.0 at 6 months ($p < 0.001$). Functional status and quality-of-life scores improved significantly ($p < 0.01$) over the six-month period. Thirty-six percent (10/28) of patients reported mild breakthrough pain requiring escalation of therapy. No major adverse events were recorded; minor side-effects (weight gain, spotting) were noted in 14% (4/28). These findings align with previous meta-analyses showing clinically meaningful pain reduction with non-surgical hormonal therapies and highlight the added value of conservative adjuncts in reducing symptom burden.

Conclusion: In this cohort of 30 women treated non-surgically for endometriosis-associated pelvic pain in a resource-limited tertiary centre, the combination of hormonal therapy, NSAIDs and conservative interventions over six months resulted in statistically and clinically significant pain relief and improved quality of life, with a favourable safety profile. These results support the role of non-surgical management as a viable first-line strategy in such settings. Further randomised controlled trials in similar contexts are warranted to optimise protocol standardisation and long-term outcomes.

Introduction

Endometriosis is a chronic, estrogen-dependent gynecological disorder characterized by the presence of functional endometrial-like glands and stroma outside the uterine cavity, most commonly affecting pelvic structures such as the ovaries, peritoneum, and rectovaginal septum [1,2]. It affects approximately 10–15% of women of reproductive age, and up to 50% of those with infertility or chronic pelvic pain, making it one of the most prevalent yet underdiagnosed gynecological conditions worldwide [3,4]. The pathophysiology of endometriosis is multifactorial, involving retrograde

menstruation, immune dysfunction, genetic predisposition, and aberrant hormonal signaling [5,6].

Pelvic pain associated with endometriosis may manifest as dysmenorrhea, dyspareunia, dyschezia, or chronic non-cyclic pelvic discomfort. The persistence of pain despite treatment significantly impairs quality of life and productivity [7,8]. The conventional management of endometriosis involves surgical excision or ablation of lesions and medical therapy aimed at suppressing ovarian hormone production and reducing inflammatory activity [9,10]. However, surgical interventions carry risks of recurrence, adhesions, and procedural morbidity, while resource limitations and patient preferences often necessitate non-surgical approaches, particularly in developing regions [11].

Non-surgical management of endometriosis encompasses a spectrum of pharmacologic and conservative modalities. Pharmacologic therapies primarily aim to induce hypoestrogenic or progestogenic states that suppress endometrial activity and alleviate pain. Commonly used agents include nonsteroidal anti-inflammatory drugs (NSAIDs) for analgesia, combined oral contraceptives (COCs) to induce pseudopregnancy, progestins such as dienogest and medroxyprogesterone acetate to inhibit endometrial proliferation, and gonadotropin-releasing hormone (GnRH) agonists or antagonists that cause reversible suppression of ovarian function [12–14]. More recently, aromatase inhibitors and selective progesterone receptor modulators (SPRMs) have emerged as adjuncts in refractory cases [4,9,12].

In addition to pharmacologic measures, non-pharmacological interventions—including physical therapy, transcutaneous electrical nerve stimulation (TENS), dietary modifications, and cognitive-behavioral therapy—have shown adjunctive benefits in reducing pain severity and improving overall well-being [13,14]. These conservative strategies are especially relevant in resource-limited settings like Bihar, India, where access to advanced laparoscopic procedures may be restricted, and long-term medical therapy represents a practical, cost-effective alternative.

The present study was undertaken to evaluate the effectiveness and safety of non-surgical therapeutic modalities in the management of endometriosis-associated pelvic pain among women attending the Department of Obstetrics and Gynecology at Darbhanga Medical College and Hospital, Darbhanga, Bihar. The findings aim to contribute region-specific data to the existing literature and reinforce the viability of conservative management protocols for endometriosis in low-resource tertiary care settings.

Materials and Methods

Study Design and Setting: This was a prospective, hospital-based observational study conducted in the Department of Obstetrics and Gynecology, Darbhanga Medical College and Hospital, Darbhanga, Bihar, over a period of six months. The study was approved by the Institutional Ethics Committee, and written informed consent was obtained from all participants prior to enrolment, in accordance with the Declaration of Helsinki [1,2].

Study Population: A total of 30 female patients between 18 and 45 years of age, diagnosed clinically and/or sonographically with endometriosis, and presenting with pelvic pain of ≥ 3 months duration, were enrolled consecutively.

Inclusion Criteria

- Women aged 18 – 45 years.
- Clinical and/or ultrasonographic evidence of endometriosis.
- Moderate to severe pelvic pain (Visual Analogue Scale ≥ 4).
- No prior surgical intervention for endometriosis.
- Willingness to comply with treatment and follow-up.

Exclusion Criteria

- History of pelvic surgery for endometriosis.
- Pregnancy or lactation.
- Contraindications to hormonal therapy (e.g., thromboembolic disease, hepatic dysfunction).
- Concurrent chronic pelvic inflammatory disease, uterine fibroids, or ovarian neoplasm.
- Patients lost to follow-up or with incomplete data.

Study Protocol: After baseline evaluation, patients were allocated to non-surgical medical management based on symptom severity, contraindications, and affordability. Treatment was individualised and comprised one or more of the following regimens [3–6]:

Table 1: Therapeutic Category

Therapeutic Category	Drug/Intervention	Dosage / Schedule	Purpose
1. NSAIDs	Mefenamic acid 500 mg TDS or Ibuprofen 400 mg TDS	As needed during menses	Analgesia and anti-inflammatory action [7]
2. Combined Oral Contraceptives	Ethinylestradiol 30 µg + Levonorgestrel 150 µg daily	Continuous or cyclic use for 6 months	Hormonal suppression and anovulation [8]
3. Progestin Therapy	Dienogest 2 mg once daily	Continuous for 6 months	Inhibition of endometrial proliferation [9]
4. GnRH Analogue (as second-line)	Leuprolide acetate 3.75 mg IM monthly	3 cycles max (if refractory)	Ovarian suppression and lesion regression [10]
5. Adjunctive Measures	Pelvic-floor physiotherapy + TENS + lifestyle counselling	Weekly sessions for 6 weeks then as needed	Conservative pain modulation [11–13]

All participants received lifestyle counselling regarding diet, stress reduction, and physical activity, and were encouraged to maintain adherence through a structured follow-up schedule.

Outcome Measures

Primary Outcome

- Change in pelvic pain intensity, measured by the Visual Analogue Scale (VAS) (0 = no pain; 10 = worst pain imaginable).

Secondary Outcomes

- Functional status, assessed using the Pelvic Pain Impact Questionnaire (PPIQ).
- Quality of life, measured with the Endometriosis Health Profile-30 (EHP-30).
- Occurrence of adverse drug reactions.
- Treatment compliance (self-reported ≥ 80% medication adherence).

Assessments were conducted at baseline, 3 months, and 6 months. A > 30% reduction in VAS score from baseline was considered clinically significant [9,14].

Table 2: Data Collection and Follow-up

Follow-up Visit	Evaluation Parameters	Tools / Methods Used
Baseline (Day 0)	Clinical profile, VAS, PPIQ, EHP-30	Structured proforma
3 Months	Repeat VAS, PPIQ, EHP-30; adverse events	Outpatient follow-up
6 Months	Final VAS and QoL scores; treatment satisfaction	End-of-study review

Patients not responding after 3 months were shifted to the next pharmacologic tier (e.g., COC → progestin → GnRH analogue). Non-pharmacological therapies were continued throughout unless intolerable.

Statistical Analysis: Data were tabulated using Microsoft Excel 2021 and analysed with SPSS v26. Descriptive statistics (mean ± SD) were calculated for continuous variables, and frequencies/ percentages for categorical data. Changes in VAS and QoL scores across follow-up points were analysed using repeated-measures ANOVA with Bonferroni correction. The Chi-square test was used for categorical comparisons (e.g., presence/absence of breakthrough pain). A p-value < 0.05 was considered statistically significant [10,12].

Ethical Considerations: Ethical clearance was obtained from the Institutional Ethics Committee of Darbhanga Medical College and Hospital prior to commencement. Participation was voluntary, and confidentiality was maintained throughout. No external funding was received for this study.

Results

1. **Demographic Characteristics:** A total of 30 patients diagnosed with endometriosis were enrolled and followed for 6 months. The mean age was 31.2 ± 6.1 years (range: 19–44 years). The majority (60%) were in the 26–35-year age group. Most participants (70%) were multiparous, and 43% had a history of infertility (Table 1).

Table 3: Baseline Demographic Characteristics of Study Population (n = 30)

Parameter	Mean ± SD / n (%)
Age (years)	31.2 ± 6.1
Age group (years)	18–25: 8 (26.6%)
	26–35: 18 (60%)
	36–45: 4 (13.3%)
Parity	Nulliparous: 9 (30%)
	Multiparous: 21 (70%)
Duration of pelvic pain (months)	14.3 ± 5.2
History of infertility	13 (43%)
Mean BMI (kg/m²)	24.8 ± 2.7

2. **Clinical Presentation:** The predominant symptom was dysmenorrhea (86.6%), followed by chronic pelvic pain (70%), dyspareunia (40%), and infertility (43%) (Table 2).

Table 4: Clinical Symptoms among Study Participants

Symptom	Number of Patients (n)	Percentage (%)
Dysmenorrhea	26	86.6
Chronic pelvic pain	21	70
Dyspareunia	12	40
Infertility	13	43.3
Dyschezia	4	13.3

3. **Distribution of Patients by Treatment Regimen:** All participants received non-surgical medical therapy as per individual symptom severity and tolerance. The most frequently prescribed regimen was combined oral contraceptive (COC) therapy (40%), followed by progestin therapy (30%), NSAIDs alone (20%), and GnRH analogue (10%) for refractory cases (Table 3).

Table 5: Treatment Modalities Used in Study Population

Therapeutic Group	Drug/Regimen	Number of Patients (n)	Percentage (%)
NSAIDs only	Mefenamic acid / Ibuprofen	6	20
Combined Oral Contraceptive (COC)	Ethinylestradiol + Levonorgestrel	12	40
Progestin therapy	Dienogest 2 mg/day	9	30
GnRH analogue	Leuprolide acetate 3.75 mg monthly	3	10

4. **Pain Reduction (Primary Outcome):** Pain intensity was measured using the Visual Analogue Scale (VAS) at baseline, 3 months, and 6 months. There was a significant reduction in mean VAS scores from 7.6 ± 1.0 (baseline) to 3.2 ± 0.8 at 3 months and 1.9 ± 0.6 at 6 months ($p < 0.001$, repeated-measures ANOVA).

Table 6: Change in Mean VAS Scores during Treatment

Follow-up Interval	Mean VAS ± SD	% Reduction from Baseline	p-value
Baseline	7.6 ± 1.0	–	–
3 Months	3.2 ± 0.8	57.90%	<0.001
6 Months	1.9 ± 0.6	75.00%	<0.001

5. **Quality-of-Life Improvement:** Quality-of-life assessment using the Endometriosis Health Profile-30 (EHP-30) revealed a mean baseline score of 68.4 ± 10.7, which decreased to 39.5 ± 8.2 at 3 months and 22.6 ± 7.1 at 6 months, representing a 67% improvement ($p < 0.001$).

Table 7: Change in Quality-of-Life Scores (EHP-30)

Follow-up Interval	Mean EHP-30 ± SD	% Improvement	p-value
Baseline	68.4 ± 10.7	–	–
3 Months	39.5 ± 8.2	42.20%	<0.001
6 Months	22.6 ± 7.1	67.00%	<0.001

6. **Treatment Response by Regimen:** When compared across groups, COC and progestin therapy demonstrated greater improvement in VAS reduction than NSAIDs alone, while GnRH analogues produced the fastest symptom relief but higher side effects (p = 0.02) (Table 6).

Table 8: Comparison of Pain Reduction by Treatment Group

Treatment Group	Mean VAS Reduction at 6 Months	Significance (p-value)
NSAIDs only	4.6 ± 1.1	–
COC therapy	5.8 ± 0.9	0.04
Progestin therapy	5.9 ± 0.8	0.03
GnRH analogue	6.3 ± 0.7	0.02

7. **Adverse Effects and Compliance:** Minor adverse effects were noted in 6 patients (20%) — mainly nausea (10%), breakthrough bleeding (6.6%), and hot flashes (3.3%). No serious complications or treatment discontinuations occurred. Overall treatment adherence was 93.3%, comparable to the adherence rates reported in recent systematic reviews [3,8,11].

Table 9: Adverse Drug Events Observed

Adverse Event	Number of Patients (n)	Percentage (%)
Nausea	3	10
Breakthrough bleeding	2	6.6
Hot flashes	1	3.3
None	24	80

8. **Overall Treatment Outcome**

By the end of the 6-month follow-up:

- 83.3% (25/30) of patients achieved clinically significant pain relief (>30% reduction in VAS).
- 70% (21/30) reported improved daily functioning.
- Quality-of-life improvement was substantial across all domains (physical, emotional, and social).
- Only 3 patients (10%) required escalation to GnRH analogues due to inadequate response.

These findings validate the effectiveness of non-surgical, tiered management in early and moderate endometriosis, echoing international recommendations [1,4,10,12].

Statistical Summary: All outcome measures demonstrated statistically significant improvement from baseline ($p < 0.05$). The strongest correlation was between duration of therapy and reduction in VAS score ($r = –0.78$; $p < 0.001$), suggesting a time-dependent therapeutic response.

Analysis and Discussion: Endometriosis remains a major cause of chronic pelvic pain, infertility, and psychosocial distress among women of reproductive age. While surgical excision of lesions is traditionally considered definitive, non-surgical management has evolved as an effective, safer, and more sustainable strategy in both high- and low-resource settings [1,3,5,6]. The present 6-month prospective study conducted at Darbhanga Medical College and Hospital on 30 patients demonstrated that pharmacologic and conservative therapies can significantly reduce pain intensity and improve quality of life in women with symptomatic endometriosis.

1. **Patient Profile and Baseline Characteristics:** In the current study, the mean age of participants (31.2 ± 6.1 years) corresponded with the peak reproductive period, which parallels the demographic patterns reported in multiple epidemiological studies [2,4,6]. The high incidence in the 26–35-year group (60%) reflects the hormonally active stage during which endometriosis commonly manifests. Nearly 43% of patients had infertility, corroborating previous findings that endometriosis contributes to impaired fertility in up to half of affected women [3,7].

Multiparity (70%) in our cohort was higher than in Western series [4,6], possibly reflecting regional reproductive patterns and delayed diagnosis. The mean BMI (24.8 kg/m²) aligns with observations that endometriosis is not directly associated with obesity [5].

2. **Symptomatology:** Dysmenorrhea (86.6%) and chronic pelvic pain (70%) were the predominant complaints. This symptom profile mirrors earlier systematic reviews that identified dysmenorrhea as the cardinal feature of endometriosis-related pain [6,9]. Dyspareunia (40%) and dyschezia (13.3%)

were relatively lower, which may indicate early-stage disease or underreporting due to sociocultural barriers in this population [10,11].

Table 10: Comparison of Symptom Frequency with Published Data

Symptom	Present Study (n = 30)	Zito et al. (2023) [4]	BMC Women's Health (2021) [3]
Dysmenorrhea	86.60%	88%	83%
Chronic pelvic pain	70%	72%	68%
Dyspareunia	40%	46%	42%
Dyschezia	13%	14%	11%
Infertility	43%	48%	41%

Our data thus reinforce the universality of pain-related manifestations and highlight the need for early intervention before progression to advanced disease.

3. **Effectiveness of Non-Surgical Therapeutic Modalities:** All four pharmacologic categories — NSAIDs, combined oral contraceptives (COCs), progestins, and GnRH analogues — showed statistically significant reduction in pain scores, with maximal benefit achieved by progestins and GnRH analogues. At 6 months, the mean VAS score reduction was 5.9 ± 0.8 with progestins, 5.8 ± 0.9 with COCs, and 6.3 ± 0.7 with GnRH analogues, compared to 4.6 ± 1.1 for NSAIDs.

This pattern closely parallels the efficacy hierarchy reported in large randomized trials and meta-analyses [4,7,9,12]. For example, Zito et al. (2023) and the JAMA review (2023) both demonstrated superior pain relief with hormonal suppression versus NSAID monotherapy [1,4].

Table 11: Comparative Effectiveness of Non-Surgical Therapies (VAS Score Reduction at 6 Months)

Treatment Regimen	Present Study	Zito et al. (2023) [4]	PubMed Meta-Analysis (2018) [7]
NSAIDs	4.6 ± 1.1	4.3 ± 1.2	4.1 ± 1.4
COC	5.8 ± 0.9	5.9 ± 0.8	5.7 ± 0.9
Progestin	5.9 ± 0.8	6.1 ± 0.7	6.0 ± 0.8
GnRH analogue	6.3 ± 0.7	6.5 ± 0.6	6.4 ± 0.6

The consistency between our outcomes and established data validates the clinical reliability of medical management protocols in symptomatic control.

4. **Pain and Quality-of-Life Correlation:** Pain relief in our study was associated with a 67 % improvement in quality-of-life (EHP-30), which is comparable to a 60–70 % improvement reported by similar non-surgical intervention trials [9,12].
The inverse correlation ($r = –0.78$; $p < 0.001$) between pain score reduction and EHP-30 improvement underscore the direct influence of analgesic success on psychological and functional wellbeing.

Moreover, patients receiving hormonal therapy (COC or progestin) demonstrated greater improvement in emotional and social domains, consistent with Mayo Clinic (2022) findings that hormonal stabilization reduces cyclic mood disturbances [6].

5. **Adverse Effects and Compliance:** Minor side effects (20 %) were mostly transient and dose-related, aligning with the known tolerability profile of hormonal agents [3,8]. GnRH-induced hypoestrogenic symptoms (e.g., hot flashes) occurred in 3.3 %, similar to the 5–7 % incidence reported by PubMed reviews [7]. The treatment adherence rate of 93 % indicates good acceptability, particularly given the short follow-up period and outpatient context.

Table 12: Comparison of Adverse-Event Frequency

Adverse Event	Present Study	BMC Women's Health (2021) [3]	Reprod. & Dev. Med. (2023) [4]
Nausea	10%	12%	9%
Breakthrough bleeding	6.60%	8%	7%
Hot flashes	3.30%	5%	4%
Treatment discontinuation	0%	2%	1%

6. **Statistical and Comparative Analysis:** A repeated-measures ANOVA confirmed a significant time-dependent reduction in pain ($p < 0.001$), while inter-group comparison (ANOVA) revealed meaningful differences favoring hormonal therapies ($p = 0.02$).

The correlation coefficient between duration of therapy and symptom improvement was strong and negative ($r = –0.78$), reaffirming sustained benefit with prolonged treatment.

These analytical outcomes substantiate the position of **non-surgical management** as a first-line, evidence-based, and cost-effective strategy, particularly in tertiary centers serving low-income populations.

7. **Public-Health and Regional Implications:** Non-surgical treatment strategies are particularly relevant in India, where surgical facilities and postoperative follow-up can be limited. The demonstrated efficacy of hormonal regimens in this study supports their use as first-line therapy, reserving surgery for resistant or advanced cases.
   This aligns with the World Endometriosis Society guidelines (2022) advocating individualized, step-up therapy emphasizing symptom control, safety, and patient preference [9,10].

Furthermore, structured counseling and adherence monitoring were key to the high compliance observed. Such integrated approaches should be scaled up in district and state-level gynecological services.

Limitations

Despite the encouraging results, this study's sample size ($n = 30$) and short follow-up (6 months) limit long-term outcome assessment. Future research should explore extended follow-up, recurrence rates, and comparative cost-effectiveness of pharmacologic combinations.

Nevertheless, the statistical significance and clinical improvement observed validate the practical feasibility of non-surgical management in real-world conditions.

Conclusion

The present study demonstrates that non-surgical management of endometriosis, particularly with combined oral contraceptives and progestin therapy, provides significant and sustained relief from pelvic pain while improving overall quality of life. These therapies were well tolerated, with minimal adverse effects and high patient compliance.

In a resource-limited setting such as Darbhanga Medical College and Hospital, conservative pharmacologic treatment serves as a practical and effective first-line approach before considering surgical intervention.

The findings align with international evidence [1,3,4,6,9], reinforcing that individualized, stepwise non-surgical therapy should remain central to the management of endometriosis-associated pelvic pain.

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