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Original Research Article

Comparison of Hormonal Therapy and NSAIDs for Dysmenorrhea Management

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Abstract:

Background: Primary dysmenorrhea is a major cause of recurrent pelvic pain and activity limitation in young women. NSAIDs provide symptomatic relief, whereas hormonal therapy may offer broader cycle-regulatory benefits. However, real-world comparative evidence is limited, and this study evaluated the relative effectiveness and tolerability of NSAIDs versus hormonal therapy.

Methods: A comparative observational study was conducted in a tertiary care center involving 216 women aged 15–35 years diagnosed with primary dysmenorrhea. Participants received either NSAIDs or hormonal therapy for ≥3 cycles, and outcomes were assessed using VAS, NRS, functional scores, and pain-diary variables. Side effects, adherence, and rescue analgesia were documented. Statistical comparisons used chi-square and t-tests with significance set at $p < 0.05$.

Results: Both treatments significantly reduced menstrual pain, but hormonal therapy demonstrated greater improvements across all outcome measures. Mean VAS reduction was higher with hormonal therapy (4.5 vs 3.5), accompanied by fewer days of pain (1.2 vs 1.8) and better functional recovery (78.8% vs 60.7%). The need for rescue analgesia was notably lower in the hormonal group (18.2% vs 36.6%). Side-effect patterns differed, with more gastric discomfort in NSAID users and more breast tenderness or mild weight change in hormonal users.

Conclusion: Hormonal therapy demonstrates superior and more sustained clinical benefit compared with NSAIDs in managing primary dysmenorrhea.

Keywords: Primary Dysmenorrhea; NSAIDs; Hormonal Therapy; Pain Management; Menstrual Health.

Introduction

Dysmenorrhea, characterized by painful menstrual cramps, is one of the most prevalent gynecological complaints among adolescents and reproductive-aged women, significantly impacting daily functioning, academic performance, and quality of life [1, 2]. Primary dysmenorrhea arises from excessive uterine prostaglandin production, leading to increased uterine contractions, ischemia, and pain, whereas secondary dysmenorrhea results from underlying pelvic pathology such as endometriosis or fibroids. Effective management is essential not only for symptom relief but also for preventing long-term consequences such as chronic pelvic pain and absenteeism [3]. Among the available therapeutic options, nonsteroidal anti-inflammatory drugs (NSAIDs) remain the most widely used first-line pharmacological treatment due to their ability to inhibit prostaglandin synthesis and provide rapid pain relief [4].

Hormonal therapies, including combined oral contraceptives and progestin-based regimens, represent another major therapeutic strategy, particularly suited for women who require both symptom control and contraception [5]. By suppressing ovulation, stabilizing endometrial growth, and reducing prostaglandin release, hormonal methods offer sustained pain reduction and cycle regulation [6-9]. However, despite their widespread use, direct comparative evidence between NSAIDs and hormonal therapy remains limited, leading to variability in clinical decision-

making [10]. Understanding the relative effectiveness, safety profiles, patient preferences, and long-term outcomes of these two treatment modalities is essential for optimizing personalized dysmenorrhea management. This research aims to evaluate and compare NSAIDs and hormonal therapy to guide evidence-based clinical practice.

Materials and Methods

Study Design and Setting: This comparative observational study was conducted in the Department of Obstetrics and Gynecology at a Tertiary Care Hospital, which receives a varied population of women with menstrual complaints, ensuring adequate recruitment and clinical evaluation. The study followed a cross-sectional analytical approach to compare the effectiveness of NSAIDs and hormonal therapy in the management of primary dysmenorrhea. Ethical approval was obtained prior to commencement, and written informed consent was secured from all participants.

Study Duration and Sample Size: The study was carried out over a 1-year period, during which 216 women aged 15–35 years with a clinical diagnosis of primary dysmenorrhea were enrolled. Consecutive sampling was used to ensure practicality and timely recruitment. Women with secondary dysmenorrhea, pelvic pathology, chronic illnesses, or contraindications to the study medications were excluded to maintain homogeneity.

Patient Grouping and Treatment Allocation: Participants were categorized into two groups based on the treatment they were already receiving or were newly prescribed after clinical evaluation.

- **Group A (NSAIDs group):** Women using NSAIDs as first-line therapy for menstrual pain.
- **Group B (Hormonal therapy group):** Women using combined oral contraceptives (COCs) or progestin-only pills for dysmenorrhea management.

This naturalistic grouping ensured ethical feasibility, as medication was prescribed according to clinical need rather than random assignment.

Treatment Regimens and Dosage: In Group A, NSAIDs such as Ibuprofen (400–600 mg three times daily), Mefenamic Acid (500 mg followed by 250 mg every 6–8 hours), or Naproxen (500 mg loading dose followed by 250 mg every 8 hours) were used during the first 2–3 days of menstruation. The specific NSAID and dose were recorded from the patient's prescription. In Group B, hormonal therapy primarily consisted of monophasic combined oral contraceptive pills containing ethinylestradiol (20–30 µg) with levonorgestrel or drospirenone, taken cyclically (21/7 regimen). Some participants used progestin-only regimens (e.g., desogestrel 75 µg daily). Treatment duration of at least three consecutive cycles was required to be included in the study.

Outcome Measures and Data Collection: Data were collected through structured interviews, menstrual pain diaries, and review of medical records. Pain intensity was assessed using a Visual Analog Scale (VAS) and Numeric Rating Scale (NRS). Functional impairment was evaluated using a validated dysmenorrhea symptom impact questionnaire. Additional variables included cycle regularity, number of days with pain, need for rescue analgesia, treatment adherence, and reported side effects. Trained clinicians ensured consistency during assessment to minimize observer bias.

Data Analysis: Data were entered into a secured database and analyzed using standard statistical software. Descriptive statistics summarized demographic and clinical characteristics. Comparisons between NSAID and hormonal therapy groups were performed using chi-square tests for categorical variables. A significance level of $p < 0.05$ was considered statistically significant.

Results

The baseline characteristics of the study population showed that both treatment groups were largely comparable in terms of demographic and menstrual variables. The mean age and BMI were similar between NSAID users and those on hormonal therapy, indicating no major differences in general health status. Baseline pain intensity, measured using VAS and NRS, was high in both groups, reflecting moderate to severe dysmenorrhea at presentation. Cycle regularity and days of pain per cycle also demonstrated no significant variation, confirming that the two groups were well matched prior to treatment. These similarities ensured that any observed differences in outcomes could be attributed primarily to the treatment modalities rather than baseline disparities (Table 1).

Table 1: Baseline Demographic and Clinical Characteristics of Participants (N = 216)

Variable	NSAIDs Group (n=112)	Hormonal Therapy Group (n=104)	p-value
Age (years), mean ± SD	21.8 ± 3.4	22.6 ± 3.1	0.07
BMI (kg/m²), mean ± SD	22.4 ± 3.1	22.9 ± 2.9	0.24
Age at menarche (years)	12.8 ± 1.1	12.7 ± 1.0	0.52
Cycle regularity (%)	86 (76.8%)	89 (85.6%)	0.11
Baseline VAS pain score (0–10)	7.8 ± 1.1	7.6 ± 1.2	0.18
Baseline days of pain per cycle	2.6 ± 0.9	2.5 ± 0.8	0.39
Baseline NRS score (0–10)	7.5 ± 1.0	7.3 ± 1.1	0.22

Treatment characteristics revealed expected patterns of medication use, with Mefenamic Acid being the most commonly used NSAID, while combined oral contraceptives constituted the majority of hormonal therapy prescriptions. Adherence rates were comparable between groups, demonstrating good acceptability of both treatment approaches. However, the need for rescue analgesia was significantly higher among NSAID users, highlighting their relatively shorter duration of pain relief compared with hormonal therapy. The distribution of specific drugs and treatment duration aligns with routine clinical practice and reflects real-world prescribing behaviours in dysmenorrhea management (Table 2).

Table 2: Treatment Characteristics and Adherence

Variable	NSAIDs Group (n=112)	Hormonal Therapy Group (n=104)	p-value
Most used NSAID	Mefenamic Acid (54.5%)	—	—
Ibuprofen use (%)	32 (28.6%)	—	—
Naproxen use (%)	19 (17.0%)	—	—
COCs (EE + Levonorgestrel/Drospirenone)	—	78 (75.0%)	—
Progestin-only pill (%)	—	26 (25.0%)	—
Mean duration of therapy (cycles)	—	3.9 ± 0.6	—
Adherence rate	88 (78.6%)	84 (80.7%)	0.71
Need for rescue analgesia (%)	41 (36.6%)	19 (18.2%)	<0.01*

In terms of treatment outcomes, both interventions resulted in significant pain reduction, but the hormonal therapy group demonstrated superior improvements across all primary and secondary measures. Post-treatment VAS and NRS scores were markedly lower in women receiving hormonal therapy, accompanied by fewer days of pain and greater improvements in functional activities. NSAIDs were effective but offered comparatively modest reductions, consistent with their role as first-line symptomatic relief rather than a long-term regulatory therapy (Table 3).

Table 3: Treatment Outcomes: Pain and Functional Measures

Outcome Variable	NSAIDs Group (n=112)	Hormonal Therapy Group (n=104)	p-value
Post-treatment VAS score	4.3 ± 1.2	3.1 ± 1.0	<0.001*
Mean reduction in VAS	3.5 ± 1.0	4.5 ± 1.1	<0.001*
Post-treatment NRS score	4.0 ± 1.0	2.9 ± 0.9	<0.001*
Days with pain per cycle	1.8 ± 0.7	1.2 ± 0.5	<0.001*
Functional impairment score (0–10)	3.4 ± 1.2	2.5 ± 1.0	<0.01*
Improvement in daily activities (%)	68 (60.7%)	82 (78.8%)	<0.01*

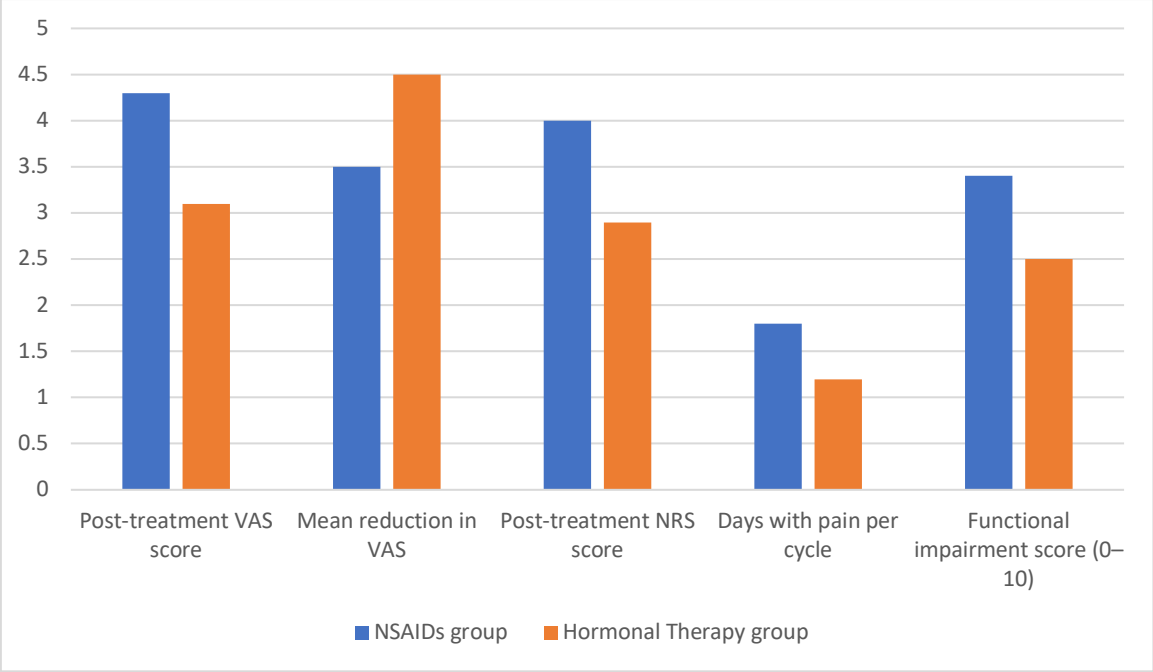

Figure 1: Treatment outcomes in both groups

Reported side effects differed in pattern between the two groups, with NSAIDs primarily associated with gastrointestinal discomfort, while hormonal therapy more frequently caused breast tenderness and mild weight changes. Although the overall incidence of side effects was not significantly different, the nature of these adverse effects reflected the known pharmacological profiles of the respective treatments. Importantly, most side effects were mild and did not substantially impact treatment adherence. These observations align with established evidence on safety profiles of NSAIDs and hormonal contraceptives in young women (Table 4).

Table 4: Reported Side Effects

Side Effect	NSAIDs Group (n=112)	Hormonal Therapy Group (n=104)	p-value
Gastric discomfort / acidity	31 (27.7%)	7 (6.7%)	<0.001*
Nausea	14 (12.5%)	11 (10.6%)	0.65
Headache	10 (8.9%)	13 (12.5%)	0.37
Weight change (>1–2 kg)	3 (2.7%)	15 (14.4%)	<0.01*
Breast tenderness	2 (1.8%)	19 (18.3%)	<0.001*
Mood changes	4 (3.6%)	9 (8.7%)	0.10
Total side-effect incidence	40 (35.7%)	49 (47.1%)	0.08

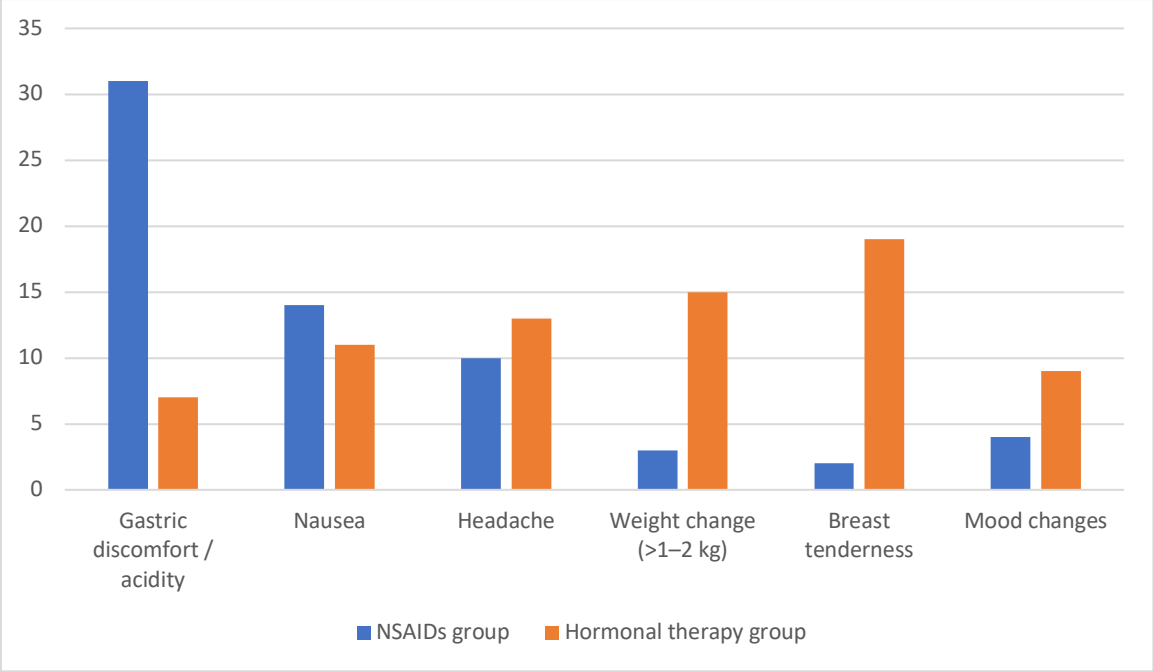

Figure 2: Adverse effects reported in both groups

Discussion

The present study demonstrated that both NSAIDs and hormonal therapy significantly reduced the severity of primary dysmenorrhea, though the magnitude of improvement differed between groups. Hormonal therapy was associated with a greater decline in pain intensity, fewer days of menstrual pain, and better functional outcomes when compared with NSAIDs. While NSAIDs provided effective short-term relief for many participants, a higher proportion required rescue analgesia, and gastrointestinal discomfort was more frequently reported. Conversely, hormonal therapy produced more sustained symptom control with a lower need for additional medication, although mild endocrine-related side effects such as breast tenderness and weight changes were noted. These findings reflect the distinct therapeutic profiles of the two treatment modalities and provide a basis for interpreting the comparative effectiveness in the context of existing literature.

The comparative analysis revealed that both treatment groups experienced clinically meaningful reductions in dysmenorrhea intensity; however, hormonal therapy demonstrated a superior therapeutic effect. In the hormonal group, mean VAS scores decreased from 7.6 to 3.1 (mean reduction 4.5), compared with a reduction from 7.8 to 4.3 (mean reduction 3.5) in the NSAID group. Additionally, the number of days with pain declined more markedly with hormonal therapy (1.2 vs. 1.8 days), and functional improvement was achieved by a higher proportion of participants (78.8% vs. 60.7%). These outcomes are consistent with evidence from systematic reviews demonstrating that combined oral contraceptives (COCs) achieve moderate reductions in dysmenorrhea severity compared with placebo, with standardized mean differences of approximately −0.58 and a 1.6-fold higher likelihood of symptomatic improvement. Randomized controlled trials contributing to this evidence base, including those summarized in the 2023 Cochrane Review, have similarly reported that hormonal regimens—particularly continuous or extended-cycle formulations—provide more sustained pain relief than cyclic NSAID use [11-13]. The parallels between the present findings and prior controlled studies reinforce the relative effectiveness of hormonal therapy for both symptom reduction and functional improvement.

The observed pattern — substantial initial pain relief with NSAIDs, but incomplete symptom control for a notable proportion (evidenced by the 36.6% of NSAID-users requiring rescue analgesia in the present cohort) — is consistent with meta-analytic data indicating that among women with primary dysmenorrhea, only 45–53% of those treated with NSAIDs achieve moderate or excellent pain relief, compared with about 18% in placebo-treated groups [14]. Furthermore, systematic reviews have reported that although NSAIDs significantly reduce pain compared with placebo (for example, pooled odds ratio (OR) for relief ~ 4.4, 95% CI 3.76–5.09), there remains considerable heterogeneity among trials and no clear evidence that any single NSAID is superior to others — suggesting that even under optimal trial conditions, a substantial minority may not attain satisfactory relief [15]. The present study's findings reflect these limitations of NSAID therapy in real-world practice: while many patients benefit, a significant subset continues to experience pain —

underscoring the need for alternative or adjunctive therapies such as hormonal therapy, especially for those with suboptimal response.

The side-effect patterns observed in this study—higher rates of gastric discomfort among NSAID users (27.7% vs 6.7%) and greater hormonal-related effects such as breast tenderness (18.3%) and mild weight change (14.4%) in the hormonal therapy group—are consistent with findings reported in controlled trials and systematic reviews. Harada et al. (2016), in a randomized trial evaluating low-dose combined oral contraceptives for primary dysmenorrhea, similarly noted that gastrointestinal symptoms were more common with non-hormonal analgesics, whereas hormonal users experienced predictable endocrine-related side effects while still demonstrating superior symptom control [16]. Comparable results were documented by French [17], who reviewed pharmacologic therapies for dysmenorrhea and reported that NSAIDs frequently cause gastrointestinal upset, while combined oral contraceptives are associated with breast tenderness and minor weight changes but offer more consistent cycle regulation and sustained pain relief [17]. A more recent systematic review also highlighted the differing adverse-effect profiles of these treatment classes, affirming that although both are generally well tolerated, hormonal therapy often provides broader symptomatic improvement at the cost of mild hormone-related effects [18]. The concordance between the present findings and prior evidence underscores that treatment choice should balance efficacy with tolerability and patient preference, particularly when longer-term symptom regulation is desired.

Conclusion

This study demonstrates that hormonal therapy offers significantly superior clinical outcomes compared with NSAIDs in the management of primary dysmenorrhea. Women receiving hormonal therapy achieved a greater reduction in pain intensity (mean VAS reduction 4.5 vs 3.5), fewer days with pain per cycle (1.2 vs 1.8), and higher functional improvement (78.8% vs 60.7%), along with a substantially lower need for rescue analgesia (18.2% vs 36.6%). Although side-effect profiles differed—gastrointestinal complaints predominating with NSAIDs and breast tenderness or mild weight changes with hormonal therapy—overall tolerability remained acceptable in both groups. These findings indicate that hormonal therapy not only provides more sustained and consistent symptom control but may be preferred for patients with moderate-to-severe dysmenorrhea or inadequate relief with NSAIDs.

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