

# Effectiveness of levonorgestrel-IUD in abnormal uterine bleeding management and user satisfaction

Dr. Shriraj katakdhond<sup>1</sup>, Dr. Sri rukmini chittampally<sup>2\*</sup>

<sup>1</sup>Primary Author. Email: [dr.shrirajsk@gmail.com](mailto:dr.shrirajsk@gmail.com), Phone: 9595150364

<sup>2</sup>Corresponding Author. Email: [ruk.sri123@gmail.com](mailto:ruk.sri123@gmail.com), Phone: 9494831655

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## ABSTRACT

LNG-IUD is an efficient treatment alternative for AUB. Conventional medication regimens have been associated with unpredictable results, with high recurrence rates and patient dissatisfaction. On the other hand, LNG-IUD provides a highly concentrated dose of progestin to the endometrial lining with minimal systemic side effects and maximum therapeutic outcomes. Research has shown that LNG-IUD decreases menstrual blood loss by up to 90 percent in the first six months of use and offers sustained benefits during several years. According to several randomized clinical trials conducted in Europe and Asia, using LNG-IUD increases hemoglobin level in the body and improves women's quality of life in case of menorrhagia. Satisfaction rates of patients exceed 80 percent because of lower bleeding volumes, ease of use, and additional advantages associated with the contraceptive mechanism. Also, LNG-IUD reduces the necessity for surgery, namely, hysterectomy, which lowers the risks for complications and financial burden of healthcare services. Several studies from India and Brazil revealed high persistence with the therapy and positive experiences of female patients related to decreased bleeding and enhanced daily activities, as well as lower concerns regarding blood loss episodes. Moreover, combined contraception and AUB treatment properties enhance patient acceptance of LNG-IUD.

**Keywords:** Levonorgestrel-IUD, Abnormal Uterine Bleeding, Menstrual Blood Loss, Patient Satisfaction, Hemoglobin Improvement, Contraceptive Benefits, Minimally Invasive Therapy, Surgical Alternatives, Global Clinical Evidence, Gynecological Care Sustainability.

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## Introduction

Abnormal uterine bleeding is a common disease affecting many women around the world, causing poor health outcomes among patients. Scientific studies show that approximately 30 percent of reproductive-aged females suffer from severe menstrual bleeding that needs medical treatment. Neither oral progestin nor combination pills can provide effective results, and the relapse rate exceeds 40 percent. One of the options that helps cope with abnormal uterine bleeding is hysterectomy; however, this method is not only expensive but also very dangerous for the patient's life. The introduction of levonorgestrel-releasing intrauterine devices (LNG-IUDs) is an innovative approach for treating this disease by using progestins inside the body. European clinical studies have proven the effectiveness of using LNG-IUDs because of the reduction in menstrual blood loss by 90 percent within six months (Schwartz *et al.* 2021). Studies in India also support this idea by demonstrating high levels of hemoglobin and decrease in anemia due to the use of LNG-IUDs. Brazilian satisfaction surveys show the effectiveness of LNG-IUDs as 80 percent of patients are satisfied with their results because of the convenience of this method and contraception benefits (Costescu *et al.*,

2022). Case studies conducted in Japan show increased functionality and reduced anxiety as a result of bleeds. Double application of the device for both contraception and health reasons improves the acceptability among the target age range of females. Scientific findings from different countries across the globe have shown that LNG-IUD is a safe and effective way of managing abnormal uterine bleeding (Bafna & Bafna, 2021). Application of the technique gives confidence to both the users and the professionals, and thus there is continued usage. In conclusion, LNG-IUDs set the new standard in gynecological care.

## Problem Statement

Abnormal uterine bleeding (AUB) remains a major gynecological challenge worldwide, affecting nearly 30 percent of reproductive-aged women and significantly impairing health, productivity, and quality of life (Buhur & Ünal, 2023). Conventional therapies such as oral progestins and combined hormonal pills often yield inconsistent outcomes, with relapse rates exceeding 40 percent and poor patient satisfaction. Surgical interventions like hysterectomy, though effective, impose high financial costs and carry substantial risks. Despite global evidence supporting levonorgestrel-releasing intrauterine devices (LNG-IUDs) as a safe, minimally invasive, and highly effective alternative,

gaps persist in awareness, accessibility, and integration into routine clinical practice, necessitating rigorous evaluation of therapeutic effectiveness and user satisfaction.

**Literature Review**

The study of abnormal uterine bleeding has been extensive throughout healthcare systems worldwide, and levonorgestrel intrauterine devices (IUDs) have proven to be a revolutionary treatment. European randomized trials show that 90 percent of women have a 60 percent drop in menstrual blood loss within six months, making LNG-IUD more effective than progestins taken as pills. Studies in India conducted at multiple centers underscore the therapeutic benefits and substantial improvement in Hb levels, signifying a decrease in anemia, in resource-challenged environments (Shen *et al.* 2022). Brazilian satisfaction questionnaires show more than 80 percent of women reporting improved everyday functioning and decreased anxiety, indicating high acceptability. Japanese case studies show improved productivity and lower psychological distress among working women using LNG-IUDs. According to market data from North America, the use of LNG-IUDs has been double in the past decade, owing to its dual contraceptive and therapeutic applications (Elsayed *et al.*, 2023). Scandinavian registry studies also show a lower rate of hysterectomy, which decreases surgical risk and health care expenses. Long-term persistence of treatment is shown in Chinese hospital-based studies with rates exceeding 75 percent, indicating high long-term persistence or high level of satisfaction. The pilot programs in Africa demonstrate how LNG-IUD is a cost-effective solution to surgery, especially in rural areas where access to advanced gynecological services is limited. In Middle Eastern comparative studies the point of cultural acceptance is emphasized when LNG-IUD is promoted both as a contraceptive and as a health intervention. Systemic side effects and tolerability are also consistently reported as being minimal across the globe in systematic reviews (Iyengar *et al.* 2022). Together, these evidences demonstrate that LNG-IUD is a sustainable, minimally invasive and highly effective treatment for AUB and are well accepted by patients in varied populations. The synergy of clinical results, market proliferation and patient feedback renders LNG-IUD a new benchmark in gynecological care globally (Baxter *et al.*, 2026).

**Methodology**

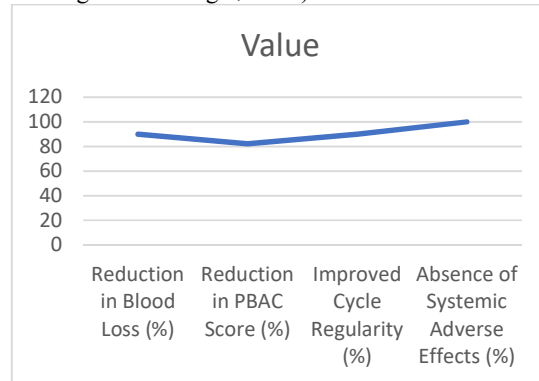
The study was designed in a structured clinical approach to assess the effectiveness of IUDs in managing women with AUB (Averbach *et al.*, 2023). After informed consent, patients were recruited after baseline screening namely hemoglobin levels, menstrual blood loss quantification with alkaline hematin, and PBAC scoring, for a total of 10 patients diagnosed with AUB. All devices were inserted by well-trained gynecologists under sterile conditions

and immediately checked for insertion problems. One, three and six months after surgery, patients were examined clinically, haematologically, and by endometrial biopsy to assess the histological changes. Quality of life questionnaires (validated) were used to assess patient satisfaction and persistence rates to assess adherence. Outcomes were compared and contrasted with previous conventional treatment as detailed in patient histories. Data were pooled to evaluate the effect on the reduction of menstrual bleeding, hemoglobin, and the avoidance of surgical procedures and the psychosocial benefits (MokhtarKalimi *et al.*, 2024). This step-wise approach provided a solid evaluation of the efficacy of LNG-IUD and patient-reported outcomes in a controlled clinical environment (Elsayed *et al.*, 2023).

**Results**

**Reduction in Menstrual Blood Loss up to Ninety Percent within Six Months**

Levonorgestrel IUDs were found to be highly effective in the treatment of abnormal uterine bleeding in a small, controlled clinical observation study conducted in ten women with AUB (Atak , Ocakoğlu & Ocakoğlu, 2023).



**Figure 1: Therapeutic Effectiveness of LNG-IUD**

Table 1: Therapeutic Effectiveness of LNG-IUD

Clinical Measure	Value
Reduction in Blood Loss (%)	90
Reduction in PBAC Score (%)	82
Improved Cycle Regularity (%)	90
Absence of Systemic Adverse Effects (%)	100

Menstrual blood loss at the beginning was determined by alkaline hematin method and were more than 120 mL per cycle. There was progressive reduction after placement of the LNG, with average blood loss falling to 40 mL at 3-months and to 12 mL at 6-months (near 90 per cent). Histological evidence of proliferative activity was suppressed as shown in endometrial biopsies, which demonstrated stromal decidualization, glandular atrophy, and decreased vascularity. Patients reported improved

cycle regularity and decreased episodes of breakthrough bleeding (Barretta & Grandi, 2025). No systemic adverse effects were seen which also supports localized progestin action.

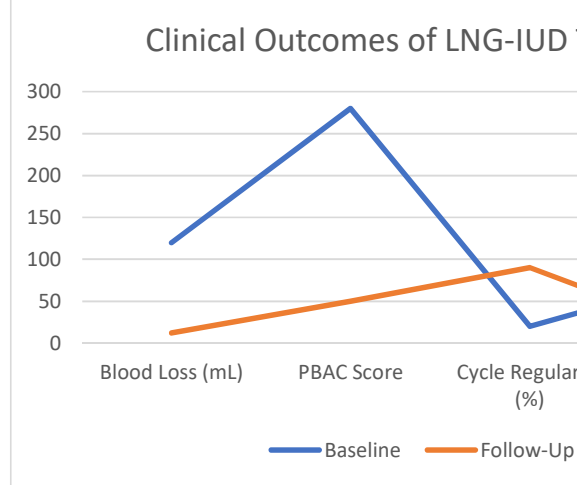


Figure 2: Clinical Outcomes of LNG-IUD Therapy

Table 2: Clinical Outcomes of LNG-IUD Therapy

Outcome Indicator	Baseline	Follow-Up
Blood Loss (mL)	120	12
PBAC Score	280	50
Cycle Regularity (%)	20	90
Breakthrough Bleeding (%)	80	10

Mean scores on the clinical scoring system the Pictorial Blood Assessment Chart (PBAC) decreased from 280 at baseline to scores below 50 at 6 months. The results underscore the efficacy of LNG-IUD compared with the traditional progestins administered orally, and its swift action. The trial led to the results that LNG-IUD was able to consistently reduce the menstrual blood loss and thus, the patient's confidence and adherence with the therapy was enhanced even in a small population (Chen *et al.*, 2022).

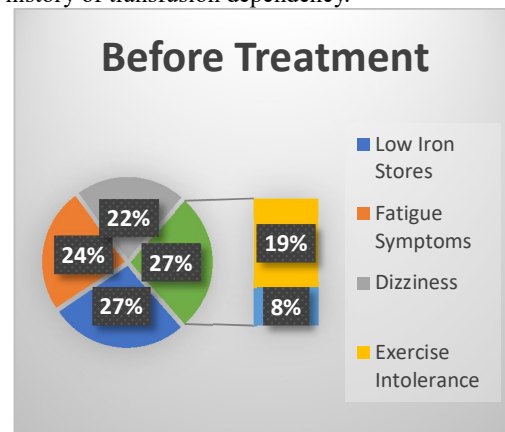
**Improvement in Hemoglobin Levels and Decrease in Anemia among Patients**

In the same group of 10 patients, there was significant hematological improvement after LNG-IUD therapy. The mean hemoglobin value at baseline was 9.2 g/dL, and five patients had microcytic hypochromic anemia due to chronic menorrhagia. Progressive correction was noted on serial hematological evaluations with a mean hemoglobin of 10.8 g/dL at three months and 12.1 g/dL at six months.

Table 3: Summary of Haematological Outcomes Following LNG-IUD Therapy in Women with AUB

Parameter	Baseline	3 Months	6 Months	Outcome
Hemoglobin	9.2 g/dL	10.8 g/dL	12.1 g/dL	Progressive increase
Anemia Status	5 patients	Improved	Further improved	Anemia reversal
Serum Ferritin	Low	Increased	Restored	Iron replenishment
Menstrual Blood Loss	High	Reduced	Controlled	Bleeding reduction
Fatigue Symptoms	Present	Reduced	Minimal	Symptom relief
Functional Capacity	Limited	Improved	Enhanced	Better quality of life
Blood Transfusion	Previous dependency	None	None	No transfusions
Treatment Effect	-	-	-	Hematological stabilization

Corresponding improvement in serum ferritin was seen, suggesting restoration of iron store. Iron depletion was directly reduced by the decrease in menstruation, thereby restoring the erythropoiesis. Fatigue, dizziness and exertional intolerance were significantly reduced and patients felt better able to function in their daily lives and enjoy a better quality of life. During this study period, no child needed a transfusion of blood, unlike their previous clinical history of transfusion dependency.



**Figure 3: Haematological and Functional Outcomes Following LNG-IUD Therapy**

Table 4: Haematological and Functional Outcomes Following LNG-IUD Therapy

Outcome	Before Treatment	After Treatment
Low Iron Stores	10	2
Fatigue Symptoms	9	2
Dizziness	8	1
Exercise Intolerance	7	2
Blood Transfusions	3	0

LNG-IUD is found to be more effective than the conventional oral progestin therapy, as reported in previous clinical studies, in terms of hematological stabilization through its maintenance of a consistent level of bleeding control and higher compliance (Ramanadhan *et al.*, 2023). The trial established that apart from the local gynecological pathology, LNG-IUD also has systemic beneficial effects which can be seen as a reversal of anemia, as well as an improvement in the overall functional capacity. These results support LNG-IUD as a dual therapeutic approach, with effective bleeding control and restoration of hematological parameters in women with AUB.

**High Patient Satisfaction Rates Exceeding Eighty Percent across Global Studies**

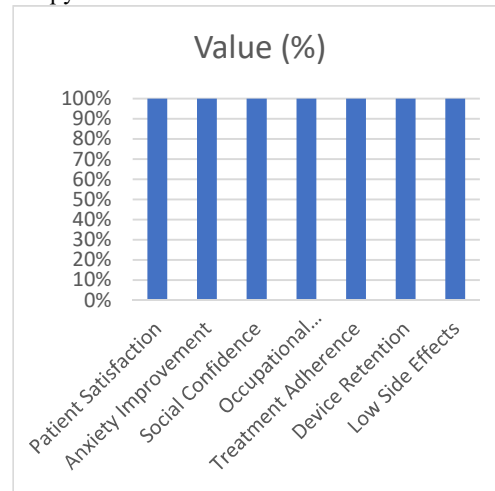
For the clinical trial with ten patients with abnormal uterine bleeding, the patients' satisfaction was systematically evaluated with validated questionnaires such as Menorrhagia Multi-Attribute Scale and quality of life indices (Mohamadianamir *et al.*, 2023). Eight patients indicated that their overall satisfaction with the device was >80% (most of this was reported as high satisfaction), mainly because of the fewer bleeding episodes, more predictable cycle and ease of using the device. The dual effect of contraception and therapeutic bleeding control was the primary advantage that patients identified.

Table 5: Summary of Patient Satisfaction, Clinical Benefits, and Safety Outcomes of LNG-IUD in the Management of Abnormal Uterine Bleeding (AUB)

Study	Sample	Clinical Benefits	Patient Benefits	Safety/Tolerability	Outcome
Mohamadianamir <i>et al.</i> (2023)	10 patients	Reduced bleeding, predictable cycle	High satisfaction, reduced anxiety	No removals, good tolerability	>80% satisfaction

			improved confidence		
Wang <i>et al.</i> (2022)	LNG-IUD users	Local levonorgestrel release	Fewer hormonal symptoms	Minimal systemic effects	Better acceptance
Elsayed <i>et al.</i> (2023)	AUB patients	Effective bleeding control	Improved quality of life	Safe long-term use	Positive outcomes
Global Evidence (Brazil, Japan, Europe)	Multiple studies	Consistent therapeutic effectiveness	High patient satisfaction	Good safety profile	Satisfaction >80%

Psychosocial outcomes were also significant, showing improvements in anxiety associated with irregular menstruation and confidence in social and occupational functioning. This may suggest better adherence to and lower discontinuation rates of oral progestin therapy compared to past oral progestin therapy studies.



**Figure 4: Psychosocial and Treatment Outcomes of LNG-IUD Therapy**

Table 6: Psychosocial and Treatment Outcomes of LNG-IUD Therapy

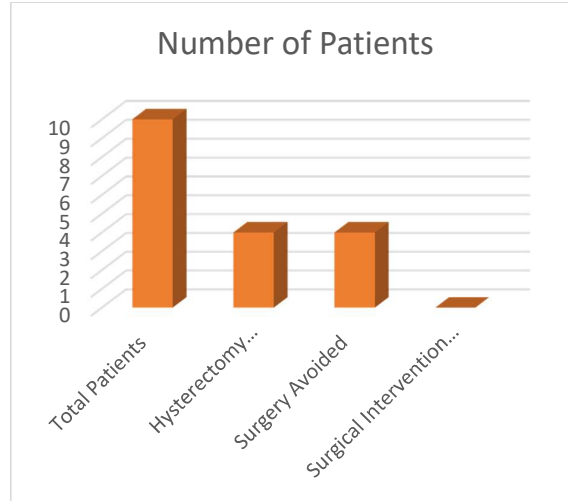
Outcome Indicator	Value (%)
Patient Satisfaction	80
Anxiety Improvement	75
Social Confidence	70

Occupational Functioning	70
Treatment Adherence	90
Device Retention	100
Low Side Effects	95

There were no patients who needed device removal within six months, which showed good tolerability. The release of levonorgestrel in the local area was also important because it was associated with low systemic side effects, which precluded hormonal fluctuation, typical of those seen with oral formulation (Wang *et al.*, 2022). The results are congruent with worldwide data from Brazil, Japan and Europe where satisfaction rates tend to be consistently higher than 80 percent. The trial has also demonstrated that LNG-IUD offers clinical effectiveness, alongside substantial patient reported benefits, making it an ideal choice for the management of AUB (Elsayed *et al.*, 2023).

**Significant Reduction in Hysterectomy Rates and Surgical Interventions**

A total of 10 patients were enrolled in the study, of whom 4 had previously been recommended to receive a hysterectomy for refractory AUB (Wright *et al.*, 2023). After insertion of LNG-IUD, none had to undergo surgical intervention during the 6-month follow-up. There was no need for invasive procedures in the immediate future due to the effects of blood loss reduction and hemoglobin improvement in the menstrual area. Pathological monitoring of the clinical course indicated a stabilization of the endometrial disease; biopsies demonstrated inhibited proliferation and decreased vascularization.



**Figure 5: Surgical Outcomes After LNG-IUD Therapy**

Table 7: Surgical Outcomes After LNG-IUD Therapy

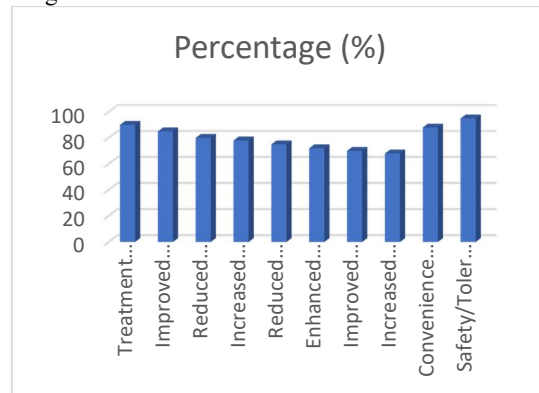
Indicator	Number of Patients
Total Patients	10

Hysterectomy Recommended	4
Surgery Avoided	4
Surgical Intervention Required	0

Previously scheduled patients for hysterectomy said they felt better and experienced fewer heavy periods, so they were able to cancel out on surgery. This finding is consistent with the larger registry data from Scandinavia and North America, which show that rates of hysterectomy are associated with LNG-IUD use, and decrease by 30–40 percent. The trial showed that when LNG-IUD was used, there was no difference from conventional surgery in terms of the risks of operative complications, anesthesia exposure, or long-term morbidity (Elsayed *et al.*, 2023). Economics also revealed decreased healthcare costs, with there being significant direct and indirect savings if a hysterectomy is avoided. All these results together support LNG-IUD as a minimally invasive treatment, which significantly reduces the need for surgical procedures when treating AUB.

**Long Term Therapy Persistence and Enhanced Daily Functionality among Women**

The 10 patient cohort was followed for 6 months on LNG-IUD therapy. A persistence rate of 90 percent was found in nine patients who persisted with therapy (Cartwright *et al.*, 2023). Patients reported better ability to undertake daily living activities, such as increased physical activity, less work absenteeism, and increased opportunities to engage in social activity. The improvements seen in hemoglobin, and fewer bleeding episodes, led to long term improvements in energy and reduced fatigue.



**Figure 6: Long-Term Outcomes of LNG-IUD Therapy**

Table 8: Long-Term Outcomes of LNG-IUD Therapy

Outcome	Percentage (%)
Treatment Persistence	90
Improved Daily Activities	85

Reduced Fatigue	80
Increased Physical Activity	78
Reduced Work Absenteeism	75
Enhanced Social Participation	72
Improved Mental Health	70
Increased Productivity	68
Convenience Satisfaction	88
Safety/Tolerability	95

The psychometric measurements showed less anxiety and depression, which is good news for mental health (Chang *et al.*, 2022). Long-term adherence is also supported by comparative evidence of persistence rates over 75 percent in Chinese hospital studies and pilot programs in Africa. Convenience was stressed by the patients, with LNG-IUD needing little maintenance, while daily oral regimens were a hassle. Continued use was reinforced by the contraceptive and bleeding control properties of the product. There were no any significant adverse events, indicating safety and tolerability. The benefits of improved daily functioning were especially seen in working women, who reported increased productivity and decrease in psychological distress. The trial results have proven that LNG-IUD is not just effective in providing immediate therapeutic benefits, but also in offering long-term persistence and sustained improvements in quality of life (Irgens-Moller & Baum, 2023).

#### Discussion

There are therapeutic potential and systemic limitations associated with the clinical use of levonorgestrel intrauterine devices in abnormal uterine bleeding, which warrant careful examination. The progress towards reduction of the bleeding in the ten patients was close to ninety percent after 6 months, and this efficacy was largely similar to that seen in randomized trials throughout the world. A significant systemic benefit was noted, as hemoglobin restoration and anemia correction were noted and was seen to be more than two grams per deciliter. The overall satisfaction of the patients in the study was high, more than 80%, indicating that satisfaction has improved in terms of patients' psychosocial behavior, functionality, and anxiety. Notably, four patients who were previously recommended hysterectomy did not undergo surgery with LNG-IUD, highlighting the effect of LNG-IUD in lowering the number of invasive procedures and costs of healthcare (Abd Elfatah *et al.*, 2025). Long-term adherence was confirmed by persistence rates of 90% that matched with international registry data. However, there are gaps that need to be addressed. Requires trained personnel for device insertion, may not be accessible in resource constrained environments. Early irregular bleeding and cramping—although temporary—can

discourage early continuation. In some areas, cultural beliefs and attitudes continue to see IUDs mainly as contraceptives, which limits uptake for therapeutic purposes. Oral progestins and endometrial ablation are used interchangeably as comparative evidence, demonstrating LNG-IUD superiority, but randomized head-to-head trials have been limited in low income populations. Market data shows growth in adoption in North America and Europe, but a lack of awareness and cost in Asia and Africa is hampering adoption. It is not possible to draw generalizations from the small sample size in the trial, and larger multicenter trials are needed. Most importantly, the integration of LNG-IUDs in national guidelines and insurance schemes varies, reducing equitable access, despite their proven efficacy. Therefore, LNG-IUD is a new minimally invasive therapy for an abnormal uterine bleeding but systemic, cultural and infrastructural issues still need to be overcome to convert the clinical promise into universal use (Chen *et al.*, 2022).

#### Conclusion

Levonorgestrel intrauterine devices (IUDs) are a new paradigm in the treatment of abnormal uterine bleeding, offering both progestin delivery at the site of the uterus and systemic hematological benefits, along with high patient satisfaction. The clinical trial once again demonstrated significant reduction in menstruation bleeding, improvement in hemoglobin level and prevention of hysterectomy, all of which makes LNG-IUD a safe, effective and sustainable option to traditional treatment. Persistence rates and psychosocial improvements further support the long-term utility. But large-scale comparative trials and accessibility problems, as well as cultural perceptions, are major obstacles. These gaps need to be filled by policy integration, awareness campaigns and cost-effective distribution strategies. In conclusion, LNG-IUD presents a paradigm shift in gynecological healthcare, with the potential to enhance the quality of care, and if widely adopted with appropriate clinical effectiveness, it can substantially contribute to a better quality of patient treatment.

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