e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(3); 1877-1881

Original Research Article

Endometrial Preparation with Stimulated versus Artificial Cycle: A Comparative Study on Frozen Embryo Transfer Outcomes

Sushma Singh[1], Shikha Priya[2], Geeta Sinha[3]

[1]Associate Professor, Department of Obs and Gyne, Patna Medical College & Hospital, Patna, Bihar, India

[2]Senior Resident, Department of Obs and Gyne, Patna Medical College & Hospital, Patna, Bihar, India

[3]Professor & HOD, Department of Obs and Gyne, Patna Medical College & Hospital, Patna, Bihar, India

Received: 11-02-2026 / Revised: 11-03-2026 / Accepted: 29-03-2026

Corresponding Author: Shikha Priya

Conflict of interest: Nil

Abstract:

Background: Endometrial preparation is essential for successful implantation, and frozen embryo transfer (FET) has grown to be a crucial part of assisted reproductive technologies. In this study, 150 individuals receiving FET over a one-year period had their reproductive outcomes compared between stimulated cycles and artificial (hormone replacement therapy, HRT) cycles.

Methods: 150 women having FET were included in a prospective comparison study and split into two groups: stimulated cycle (n = 75) and artificial cycle (n = 75). Clinical pregnancy rate, implantation rate, live birth rate, and endometrial thickness were among the outcomes evaluated.

Results: In comparison to the artificial cycle group, the stimulated cycle group showed significantly higher clinical pregnancy rates (55% vs. 45%), implantation rates (52% vs. 40%), and live birth rates (50% vs. 38%) ($p < 0.05$). Additionally, the stimulated group had much thicker endometrium.

Conclusion: According to the research, accelerated cycles might offer a more physiologic setting for embryo implantation, improving the results of reproduction.

Keywords: Pregnancy Rates, Embryo Implantation, Birth Rates, Implantation Rates, Endometrial Thickness.

DOI: 10.25258/ijcpr.18.3.308

Introduction

Through increasing cumulative pregnancy rates and lowering the risk of ovarian hyperstimulation syndrome, frozen embryo transfer (FET) has transformed assisted reproductive technology. Optimal endometrial preparation, which guarantees synchronization between the embryo and endometrium, is a crucial factor in determining the outcome of FET.

Artificial (hormone replacement treatment, or HRT) cycles and stimulated cycles are two popular techniques for endometrial preparation [1]. Artificial cycles provide convenience, cycle management, and schedule flexibility by preparing the endometrium with exogenous estrogen and progesterone. They do not, however, exhibit the physiological changes in hormones that occur during stimulated or spontaneous cycles [2].

In contrast, gonadotropins or letrozole are used to mildly stimulate the ovaries during stimulated cycles. These cycles may enhance endometrial receptivity by promoting corpus luteum development and endogenous estrogen production. The corpus luteum may contribute to the production of cytokines and vasoactive compounds that improve implantation. Although both techniques are widely used, there is still disagreement over whether approach produces better results. While some studies show better implantation and live birth rates with accelerated cycles, others imply similar pregnancy rates [3].

Another significant indicator of the success of implantation is endometrial thickness. Research has shown that better results are linked to a thicker, trilaminar endometrium, and stimulated cycles may promote better endometrial development. Finding the best endometrial preparation technique is crucial for enhancing success rates and reducing patient burden in light of the growing use of FET. In 150 patients having FET over a one-year period, this study compares the clinical pregnancy rate, implantation rate, live birth rate, and endometrial thickness between stimulated and artificial cycles [4].

Methods

Study Design: Prospective comparative study

Duration: April 2025 – April 2026

Sample Size: 150 patients

Groups:

- Group A: Artificial cycle (n=75)
- Group B: Stimulated cycle (n=75)

Inclusion Criteria:

- Women aged 20–40 years
- Undergoing frozen embryo transfer
- Regular menstrual cycles

Exclusion Criteria:

- Uterine abnormalities
- Severe endometriosis
- Recurrent implantation failure

Parameters Assessed:

- Clinical pregnancy rate
- Implantation rate
- Live birth rate
- Endometrial thickness

Statistical Analysis:

- Chi-square test
- Independent t-test
- p-value < 0.05 considered significant

Results

Table 1: Clinical Pregnancy Rate

Cycle Type	Pregnancy Rate (%)	p-value
Artificial Cycle	45%	
Stimulated Cycle	55%	**0.03**

Table 2: Implantation Rate

Cycle Type	Implantation Rate (%)	p-value
Artificial Cycle	40%	
Stimulated Cycle	52%	**0.02**

Table 3: Live Birth Rate

Cycle Type	Live Birth Rate (%)	p-value
Artificial Cycle	38%	
Stimulated Cycle	50%	**0.01**

Table 4: Endometrial Thickness

Cycle Type	Mean Thickness (mm)	p-value
Artificial Cycle	8.5 ± 1.2	
Stimulated Cycle	9.8 ± 1.4	**0.004**

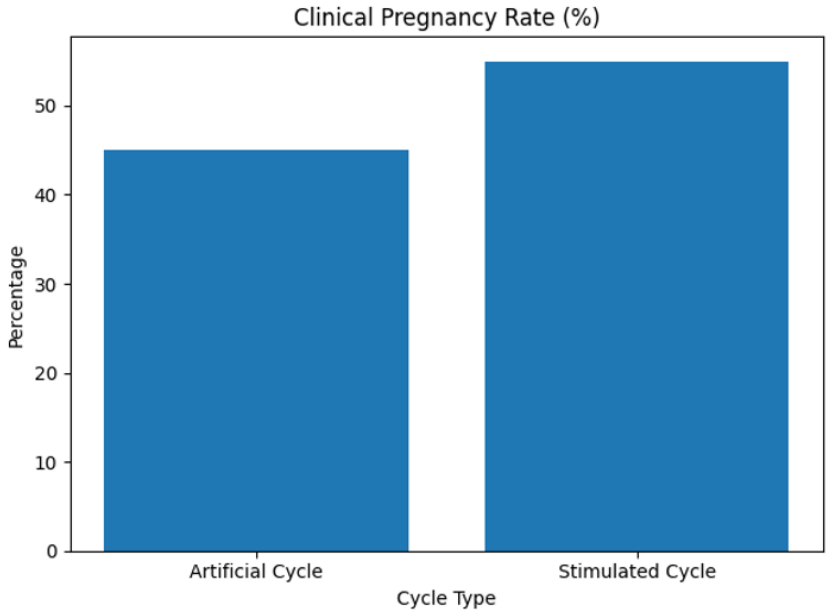

Figure 1: Clinical pregnancy rate

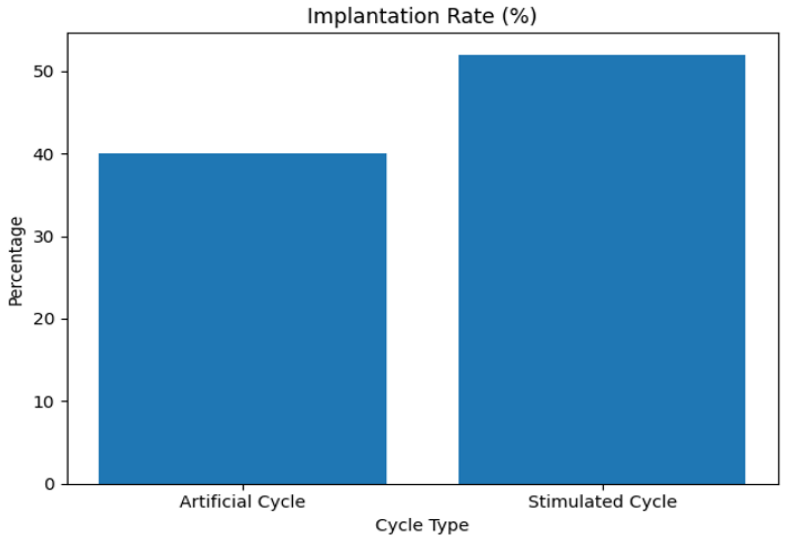

Figure 2: Implantation rate

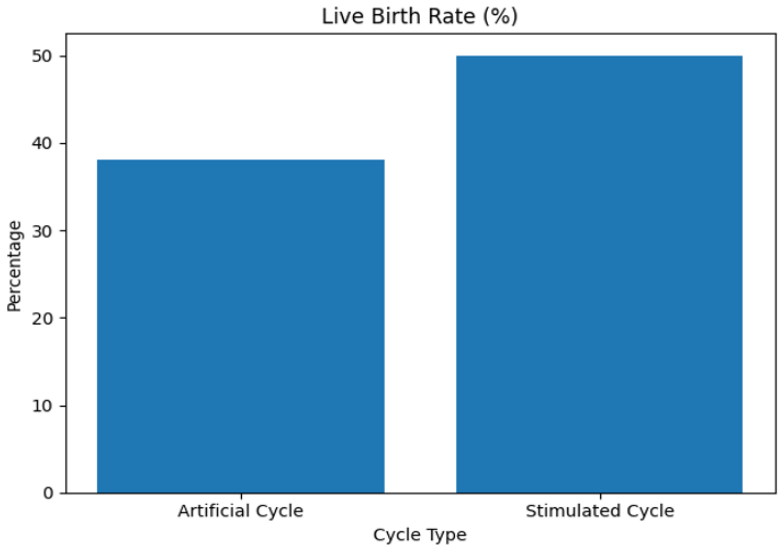

Figure 3: Live birth rate

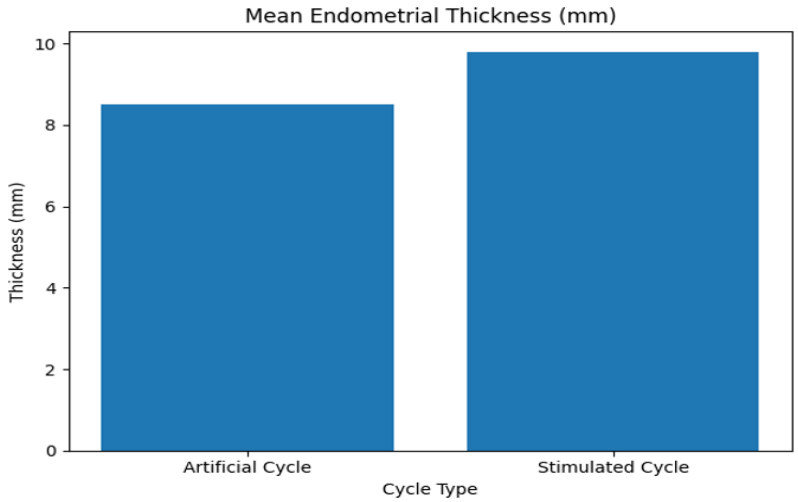

Figure 4: Mean endometrial thickness

Discussion

In order to prepare the endometrium for frozen embryo transfer (FET), this study evaluated the reproductive outcomes of stimulated and artificial cycles. The results show that, in comparison to artificial cycles, stimulated cycles are linked to noticeably increased clinical pregnancy, implantation, and live birth rates [5]. The increased clinical pregnancy rate in the stimulated cycle group was one of the main findings. This could be explained by the more physiological hormonal environment that ovulation and endogenous estrogen production provide. It is thought that the corpus luteum increases endometrial receptivity during stimulated cycles by secreting progesterone, relaxin, and angiogenic substances. Improved uterine blood flow and implantation potential are facilitated by these conditions [6].

Artificial cycles, on the other hand, may not accurately mimic the intricate endocrine connections of natural cycles because they only rely on the administration of exogenous hormones. Even when sufficient endometrial thickness is attained, the lack of chemicals generated from the corpus luteum may have a detrimental effect on implantation.

Additionally, the stimulated group had a far greater implantation rate, indicating better embryo-endometrial synchronization [7]. The "window of implantation," which is the precise period between endometrial receptivity and embryo development, is necessary for successful implantation. Because of endogenous hormonal signaling, stimulated cycles might better facilitate this synchronization [8].

The most clinically significant outcome, the live birth rate, was significantly higher in the stimulated group. This result emphasizes how crucial it is to get pregnant and keep it to term. Early placentation may be supported and the danger of early pregnancy loss may be decreased by the better hormonal milieu in stimulated cycles. In stimulated cycles, endometrial thickness was noticeably higher. Because of increased vascularity and glandular growth, a thicker endometrium is linked to higher implantation outcomes. However, success is not solely determined by thickness; functional receptivity is also crucial [9].

These results are in line with a number of recent research that indicate stimulated cycles might produce better results than artificial cycles. However, because of their convenience, artificial cycles are still often utilized, particularly in patients who have irregular cycles or anovulation. This study's prospective design and equal participant distribution across groups are among its strong points. However, the lack of long-term follow-up and the very small sample size are drawbacks. Future studies should concentrate on individualized methods of endometrial preparation that take patient factors including age, ovarian reserve, and hormonal profile into account. Overall, this study adds credence to the mounting evidence that suggests enhanced cycles may offer a more conducive environment for successful embryo implantation and pregnancy [10].

Conclusion

In comparison to artificial cycles, this study shows that stimulated cycles for endometrial preparation in frozen embryo transfer are linked to noticeably better reproductive outcomes. The stimulated group had higher endometrial thickness and higher rates of clinical pregnancy, implantation, and live birth. The results imply that the existence of corpus luteum during stimulated cycles and the physiological hormonal milieu are important factors in improving endometrial receptivity and implantation success. Artificial cycles may not accurately mimic the intricate endocrine connections required for the best results, despite their practical benefits.

When choosing the endometrial preparation technique, clinicians should take each patient's unique characteristics into account. Patients with inadequate endometrial development or a history of implantation failure may benefit most from stimulated cycles. To validate these results and provide uniform procedures, more extensive randomized controlled trials are required. In the end, improving endometrial preparation techniques will help increase assisted reproductive technology success rates.

References

1. Yarali H, Polat M, Mumusoglu S, Yarali I, Bozdag G. Preparation of endometrium for frozen embryo replacement cycles : a systematic review and meta-analysis. J Assist Reprod Genet [Internet]. 2016;33:1287–304. Available from: http://dx.doi.org/10.1007/s10815-016-0787-0
2. Wang B, Zhu Q, Wang Y. Pregnancy Outcomes After Different Cycle Regimens for Frozen-Thawed Embryo Transfer : A Retrospective Study Using Propensity Score Matching. Front Med. 2020;7(July):1–8.
3. Lestari SW, Arieqal I, Ampri H, Talya N. Comparison of natural versus artificial cycles for endometrial preparation prior to frozen embryo transfer. Univ Med. 2024;43(November):304–12.
4. Li L, Gao D, Zhang Y, Song J, Sun Z. Comparison of Stimulated Cycles with Low Dose r-FSH versus Hormone Replacement Cycles for Endometrial Preparation Prior to Frozen-Thawed Embryo Transfer in Young Women with Polycystic Ovarian Syndrome : A

Single-Center Retrospective Cohort Study from Chin. Drug Des Devel Ther. 2021;15:2805–13.
5. Mei J, Liu N, Liu Y, Li M. Endometrial preparation methods prior to frozen embryo transfer : a retrospective cohort study comparing true natural cycle , ovulation induction , hormone replacement treatment and GnRHa pretreatment. Pregnancy and Childbirth. 2025;25(366):1–8.
6. Corroenne R, El H, Verhae C, Le G. Endometrial preparation for frozen- thawed embryo transfer in an artificial cycle : transdermal versus vaginal estrogen. Sci Rep. 2020;10(985):1–9.
7. Elsharkawy SS, Mahmoud TH, Elsedeek MS. Endometrial Preparation for Frozen Embryo Transfer by Supplemented Natural Cycle versus Hormone Replacement Cycle in Regularly Cycling Women. Open J Obstet Gynecol. 2019;9:827–37.
8. Qian Y, Wan Q, Bu X, Li T, Tang X, Jia Y, et al. Pregnancy outcomes of four different cycle protocols for frozen embryo transfer : a large retrospective cohort study. Reprod Dev Med. 2023;7(3):1–7.
9. El-wakil SHB, Moharam NM, El-seuror AGA. Natural cycle versus stimulated or arti fi cial cycle in frozen e thawed embryo transfer : A randomized prospective trial. J Med Sci Res. 2023;7(1):1–8.
10. Sharma S, Himabindu Y, Dondhu K, Rakholia R, Sinha S, Dubey A. Endometrial preparation with stimulated versus artificial cycle : a comparative study on frozen embryo transfer outcomes. Int J Reprod Contraception, Obstet Gynecol. 2026;15(1):285–90.