

Endometrial Thickness and Reproductive Outcomes in Female Infertility: A Systematic Review of Clinical Evidence

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ABSTRACT

Background

Thin endometrium is associated with impaired implantation and reduced reproductive outcomes, particularly in assisted reproductive treatment. Endometrial thickness (EMT), assessed primarily by transvaginal ultrasonography, is a commonly used marker of endometrial development. Ayurveda conceptualizes female infertility through conditions such as Vandhyatva and Artava Kshaya, with emphasis on Apana Vata, Kshetra, and tissue nourishment.

Objective

To systematically review the clinical evidence regarding Ayurvedic interventions in female infertility where EMT or related reproductive outcomes were evaluated, and to assess the methodological limitations of the available evidence through 2026.

Methods

The review was structured according to PRISMA 2020 principles. Electronic and registry sources were considered from database inception through 2026. Human clinical studies, case reports/case studies, and ongoing registered trials were considered separately. Because of substantial heterogeneity quantitative meta-analysis was not performed.

Results

The direct evidence comprised of a single-arm pilot study of 15 patients on Saubhagyanandana Ghrita Yonipichu and a randomized study with comparative evaluation of Phalaghrita Uttarabasti with and without oral Phalaghrita (20 patients). The latter reported mean increases in EMT of 5.3 to 9.0 mm and 5.4 to 9.5 mm in the two treatment groups, respectively. A randomized, double-blinded, placebo-controlled study in 2026 using standardized Shatavari root extract in women with PCOS found a significant difference between the groups in this study for change in EMT. Limited evidence was found from case reports and registered ongoing trials.

Conclusion

Selected Ayurvedic interventions show preliminary potential for improving EMT and reproductive parameters, but larger, well-designed randomized trials with clinically relevant fertility outcomes are needed to confirm their efficacy.

Keywords: Endometrial thickness; Female infertility; Ayurveda; Vandhyatva; Uttarabasti; Endometrial receptivity.

1. INTRODUCTION

Female infertility is a significant reproductive health issue and can be caused by several factors working together, such as: Ovulatory dysfunction, Tubal abnormalities, Uterine factors, Endocrine disturbances, Age-related reproductive decline, Male-factor infertility and Unexplained causes. The endometrium is an essential part of the uterine environment, which is crucial for successful implantation and establishment of pregnancy, within this multifactorial framework.

EMT is a clinical and research-measurable indicator of endometrial development, most simply measured by transvaginal ultrasonography. Some assisted-reproductive settings have correlated relatively thin endometria with decreased pregnancy rates, typically defined as less than 7 mm. Yet, EMT should not be used as a definitive biological barrier – there are other factors which affect reproductive outcome and EMT has only partial discriminatory ability for individual reproductive outcomes. [1]

According to Ayurveda, the health of females is seen in an integrated way considering Ritu, Kshetra, Ambu and Beeja. The uterine environment is important to Kshetra and sufficient nourishment and the proper performance of reproductive tissues is important to conception. Reduced or altered menstruation can be understood using the concept of Artava Kshaya and disturbances of Apana Vata and insufficient nourishment of tissues can be understood within the Ayurvedic pathophysiological framework.

Ayurvedic treatment for women who are unable to conceive can include oral medicines, local treatments like Uttarabasti and Yonipichu, changes in diet and lifestyle and some specific Panchakarma treatments. These strategies have been the subject of clinical research under other reproductive settings. Several have specifically recruited women with thin endometrium, while others have investigated wider infertility or polycystic ovarian syndrome (PCOS) cohorts, on which EMT was one of a number of outcomes measured. [2-6]

It is important to distinguish the direct evidence from the indirect evidence, especially for interpretation. The study specifically recruited women due to objective evaluation of thin endometrium is direct evidence of the clinical question being reviewed in this review. A study of women with PCOS or more generally women with infertility, on the other hand, where the outcome of interest is EMT can only give indirect evidence and cannot directly be extrapolated to women with isolated thin endometrium infertility. [7-9]

The current literature suggests that caution should be used with an EMT threshold of 7 mm. In several assisted-reproduction studies, thinner endometrium has been linked to poor reproductive outcomes, but EMT alone is not a good enough marker for pregnancy or live birth for it to be used independently as a surrogate for endometrial receptivity. [1]

There is a relative paucity and diversity of clinical literature in Ayurveda on the topic of thin endometrium. There is significant variation in published reports regarding patient selection, combinations of interventions, treatment duration, US assessment, use of comparator, and fertility outcome. A few reports are uncontrolled studies and case reports, while a few comparative or randomized studies have been made available. Furthermore, new evidence has been published in 2025 and 2026 and recent clinical trials are now registered, which offers an opportunity to add to the evidence base.

The aim of the present systematic review was, therefore, to critically summarise the available Ayurvedic clinical evidences related to EMT and female infertility and differentiate direct evidences with indirect evidences, summarise reproductive outcomes, evaluate methodology limitations and identify priorities for future clinical studies.

2. METHODS

2.1 Study Design and Reporting Standard

This systematic review was conducted and reported according to the PRISMA 2020 statement.[10] PRISMA-S principles were additionally used to ensure transparent reporting of information sources and search strategies.[11] No prospective protocol was registered in PROSPERO.

2.2 Eligibility Criteria

Studies were included if they: (1) involved human participants; (2) evaluated women with infertility or clinically relevant female reproductive conditions; (3) assessed an Ayurvedic intervention; (4) reported EMT, endometrial receptivity, or another relevant reproductive outcome; (5) were original clinical

research, randomized or non-randomized clinical studies, case reports/case studies, or registered clinical trials; and (6) provided sufficient intervention and outcome information.

Animal and in-vitro studies, secondary publications without original clinical data, studies without EMT or relevant reproductive outcomes, exclusively non-Ayurvedic interventions, and duplicate publications or registry records were excluded. Registered trials without outcome data were retained only in the evidence map and not considered completed efficacy studies.

2.3 Information Sources

PubMed/MEDLINE, Scopus, Clinical Trials Registry–India (CTRI), and Google Scholar were searched, with reference-list screening of relevant publications. The updated search covered records from database inception through 2026.

2.5 Search Strategy

The search strategy combined four concepts: Ayurveda, female infertility, endometrium/endometrial thickness, and reproductive outcomes. Representative terms included “Ayurveda,” “female infertility,” “Vandhyatva,” “thin endometrium,” “endometrial thickness,” “endometrial receptivity,” “Artava Kshaya,” “Uttarabasti,” “Uttarbasti,” “Yonipichu,” “Phalaghrita,” “Saubhagyanandana Ghrita,” “Jeevaniya Churna,” “Balaadi Churna,” “Methikadya Churna,” “Shatavari,” “Asparagus racemosus,” “Panchakarma,” “PCOS,” and “clinical trial.” Boolean operators were applied where appropriate. As complete database-level export files and search histories for all 2026 searches were unavailable, historical PRISMA counts were not reconstructed as a complete 2026 search; the previously documented search set was therefore reported separately from the updated 2025–2026 evidence map.

2.6 Study Selection

Titles and abstracts were screened, followed by full-text assessment of potentially eligible reports. In the previously documented search set, 37 records were identified and screened. After duplicate removal and exclusion of ineligible records, six published human clinical reports were retained in the original qualitative synthesis. Newer evidence was assessed separately and incorporated into the updated evidence map.

2.7 Data Extraction

Data extracted included author/year, study design, population, sample size, diagnostic criteria, intervention and dose, comparator, treatment duration, EMT measurement and timing, ultrasound parameters, endometrial receptivity measures, menstrual/ovulatory outcomes, conception and pregnancy outcomes, safety/adverse events, and trial-registration details.

2.9 Risk of Bias Assessment

Randomized studies were assessed across standard domains including randomization, deviations from intended interventions, missing outcome data, outcome measurement, and selective reporting.[10] Non-randomized studies were qualitatively assessed for participant selection, comparability, intervention ascertainment, outcome measurement, and reporting completeness. Case reports/case studies were considered very-low-certainty evidence because of the absence of comparators and potential selection, reporting, confounding, and publication biases.

2.10 Data Synthesis

A narrative synthesis was performed because of substantial heterogeneity in populations, interventions, comparators, treatment duration, EMT assessment, outcome definitions, and study designs. Therefore, quantitative meta-analysis was not performed.

3. RESULTS

3.1 Study Selection

The previously documented search set contained 37 records, Eight duplicate records were removed, leaving 29 records for title and abstract screening. Fifteen records were excluded at the screening stage: Animal studies: 4, Review articles: 6, Irrelevant records: 5. Fourteen reports were sought for retrieval. Two reports could not be retrieved, leaving 12 reports for full-text assessment. Six reports were subsequently excluded because of:

- No eligible EMT or relevant reproductive outcome: 3
- Insufficient clinical information: 2
- Duplicate publication: 1

Thus, six published human clinical reports were retained in the historical qualitative synthesis.

3.2 Direct Clinical Evidence for Thin Endometrium

3.2.1 Saubhagyanandana Ghrita Yonipichu with Jeevaniya Churna

Rupareliya, Donga and Gandhi did a one-armed, open label clinical pilot study on 15 women with EMT < 7 mm. Participants were given 10mL of Saubhagyanandana Ghrita Yonipichu for six days since the onset of the menstrual period was stopped for one period and Jeevaniya Churna in milk twice a day for 30 days.

The investigators assessed EMT and various components of the Appelbaum Uterine Scoring System for Reproduction (USSR). The improvements of EMT, endometrial layering, myometrial echogenicity, uterine Doppler flow, zone-3 endometrial blood flow, and total USSR score were statistically significant. There were also reports of improvement in menstrual abnormalities and ovulation; one patient became pregnant after the treatment.[2]

This study is especially relevant since the patients were chosen based on the presence of thin endometrium. It is thus direct evidence for the clinical question.

3.3 Phalaghrita Uttarabasti with or without Oral Phalaghrita

The small randomized comparative clinical study by Tanwar et al included 20 women who had thin endometrium. Ten participants were administered Phalaghrita Uttarabasti only and ten participants were administered Phalaghrita Uttarabasti along with oral Phalaghrita.

The published report mentions that Uttarabasti was given at 3 mL on 6th, 8th and 10th day for 3 menstrual cycles. The combined treatment group were also given Phalaghrita 10 mL twice a day in warm milk for three cycles. The mean value of EMT recorded in the Uttarabasti-alone group was 5.3 mm and in the combined-treatment group was 9.5 mm, up from 5.4 mm. Of these, 50% and 65%, respectively, reported conception. [3]

The findings are clinically relevant as the study focused on women with a thin endometrium, and a comparative treatment design was implemented.

3.4 Indirect Clinical Evidence

3.4.1 Shatavari Root Extract in Women With PCOS

The trial conducted by Mhatre and colleagues was a prospective randomized, double-blind, placebo-controlled study to assess the standardized Shatavari root extract in women with PCOS. 70 women were randomized to Shatavari (35) and placebo (35). The twelve weeks intervention was completed by 66 participants. Shatavari was found to significantly increase EMT over placebo in the study. In the Shatavari group, EMT increased by 1.33 ± 2.23 mm while in the Placebo group, EMT increased by 0.20 ± 1.84 mm, and the P value reported was 0.028 for between-group differences.

The study also found changes in follicular count and perceived stress. No serious adverse events were reported, and 11.4% of participants in the Shatavari group and 8.5% in the placebo group reported mild-to-moderate adverse events.[4]

This study was methodologically better than the uncontrolled pilot studies since it used randomization, double blinding, placebo controls and prospective evaluation of outcomes.

3.5 Other Ayurvedic Female-Infertility Studies

A number of clinical studies in Ayurveda have been conducted to treat female infertility, anovulation, PCOS and Artava Kshaya in which there was no specific selection of women with a thin endometrium. Donga et al. compared the effect of Nasya with Matra Basti on 24 female infertile women due to anovulatory causes and reported that there were ovulations in both groups, though there were more women ovulating in Matra Basti group.[5] For the present review question, however, this evidence was largely indirect, since the population was based on anovulation and not limited to those with a thin endometrium.[5]

Bhingardive et al. treated women with PCOS with Vamana Karma followed by Shatapushpadi Ghanavati and observed the changes in menstrual irregularity and certain metabolic and ovarian parameters in the patients with PCOS.[6] The population and main clinical interest was PCOS and Artava Kshaya, so the results could not be considered as direct evidence for the treatment of thin endometrium.[6]

Likewise, in women suffering from female infertility due to anovulatory factors, Balat et al. have studied Brihatyadi Yapana Basti and Shivalingi seed powder, which gives contextual evidence to

ayurvedic management of female infertility, but does not give evidence for the individual effect of intervention on thin endometrium. [7]

Taken together, these studies indicate clinical interest in Ayurvedic approaches to female infertility but provide only indirect evidence for the specific question of thin-endometrium infertility.

3.6 Case Reports and Case Studies

Case based evidence offers context in the form of clinical cases, but is highly uncertain as there is no comparator and the natural history of the disease is not distinguishable from treatment effects.

In a case called by Gambhire-Bhadugale, the endometrium was thin and was reverted to 9 mm with improvement in menstrual flow and subsequent conception in 5 months with Ayurvedic treatment.[8] The treatment consisted of Ayurvedic medicines and Phalaghrita Uttarbasti.[8]

The temporal association is clinically significant but this does not establish treatment efficacy in a single case. Other patient-related factors, such as Spontaneous variation, concomitant interventions, natural conception probability, and others, could not be ruled out.

Susarla and colleagues have reported a 31-year old woman with secondary infertility and Artava Kshaya who received multimodal Ayurvedic treatment program comprising of Vamana, Virechana, Yogabasti, Nasya, Matra Basti, Uttarbasti, oral medicines, dietary measures and lifestyle modifications. Later, the patient became pregnant and gave birth to a healthy baby.[9]

The case shows that, in real life situations, it is difficult to assess the effect of Ayurvedic treatment on reproduction, but the case does not provide any clue to the effect of which part of this treatment was responsible.

Case reports must therefore be thought of as hypothesis generating evidence, and cannot be used alongside randomized studies for estimating treatment effectiveness.

4. ONGOING AND REGISTERED CLINICAL TRIALS

The updated search identified several registered Ayurvedic trials relevant to female infertility, endometrial receptivity, EMT, or ovulatory dysfunction.

4.1 Saubhagyanandana Ghrita and Balaadi Churna

CTRI/2026/02/103112 is a registered Single Arm Clinical Trial to study the effect of Saubhagyanandana Ghrita and Baladi Churna in Vandhyatva with special reference to endometrial receptivity. Registered outcomes are parameters for Appelbaum uterine scoring system, ultrasonographic colour Doppler assessment. No completed outcome data were available and published, and therefore should not be considered as evidence of treatment efficacy, but rather as evidence that is ongoing.

4.2 Methikadya Churna

CTRI/2026/02/103113 is a registered clinical trial evaluating the effect of Methikadya Churna in Vandhyatva with special reference to anovulatory cycles which is a randomized clinical trial. One of the EMTs assessed by ultrasonography is reported. The study should be classified as ongoing registered evidence, until completed results are publicly available.

4.3 Gynoveda Formulations

CTRI/2025/11/097011 describes an open-label, single-arm, multicentric prospective clinical study evaluating Poshini, Upaja, and Rutuja formulations in female infertility. EMT is included among the reported outcomes. The presence of EMT as an outcome makes the trial relevant to the present evidence map; however, registered status alone cannot establish effectiveness.

5. SUMMARY OF INCLUDED EVIDENCE

Study	Population	Design	Sample	Main EMT/ Reproductive Finding	Evidence Category
Rupareliya et. al. [2]	Thin endometrium	Single-arm pilot	15	Significant improvement in EMT and USSR parameters; 1	Direct; low certainty

				conception reported	
Tanwar et. al. [3]	Thin endometrium	Randomized comparative study	20	EMT 5.3→9.0 mm and 5.4→9.5 mm; conception reported in both groups	Direct; very low/low certainty
Mhatre et. al. [4]	PCOS	Double-blind placebo-controlled RCT	70 randomized; 66 completed	EMT change 1.33 vs 0.20 mm; P=0.028	Indirect; stronger methodological evidence
Donga et. al. [5]	Anovulatory infertility	Comparative clinical study	24	Ovulation outcomes reported	Indirect
Bhingardive et. al. [6]	PCOS/Artava Kshaya	Clinical study	15	Menstrual and ovarian/metabolic improvements	Indirect
Balat et. al. [7]	Anovulatory infertility	Open-label randomized study	Reported clinical cohort	Reproductive outcomes reported	Indirect
Gambhire-Bhadugale et. al. [8]	Thin endometrium	Case study	1	EMT 6.1→9 mm; conception reported	Case-based; very low certainty
Susarla et. al. [9]	Secondary infertility/Artava Kshaya	Case report	1	Conception and healthy delivery reported	Case-based; very low certainty
CTRI/2025/11/097011	Female infertility	Prospective single-arm	200 target	EMT among outcomes	Ongoing
CTRI/2026/02/103113	Vandhyatva/anovulatory cycles	RCT	92 target	EMT among outcomes	Ongoing
CTRI/2026/02/103112	Vandhyatva/endometrial receptivity	Single-arm	40 target	EMT/receptivity outcomes	Ongoing

6. DISCUSSION

The present systematic review found few and varied clinical studies available on Ayurvedic interventions and EMT for female infertility. A major conclusion is that the evidence should be seen as one monolithic research body, which is not the case. Direct studies in women with thin endometrium, indirect studies in other PCOS or infertility populations, case reports and current registered trials are significantly different types of evidence.

EMT has been directly shown to increase in both small ones arm pilot study and small randomized comparative study of Saubhagyanandana Ghrita Yonipichu and Jeevaniya Churna, and Phalaghrita Uttarabasti and Phalaghrita as well as its use in oral route. [2,3] The size of these changes, however, needs to be understood in the light of their small sample sizes, methodological limitations and variations in treatment protocols.

The Rupareliya study is important as all participants had EMT below 7 mm and the intervention was specifically looked at in women with thin endometrium, [2] besides EMT the investigators have

examined endometrial layering, myometrial echogenicity, uterine Doppler parameters, zone-3 blood flow, and USSR. These multiple measures give a more comprehensive evaluation of the uterine environment than EMT does. However, the study was single arm, open label, so the results observed cannot be definitively associated with the intervention.

Regression to the mean is especially important when it comes to a biological measurement in an uncontrolled study. The subsequent measurements may be closer to the normal range, even if no effective intervention is used, because the participants were selected for an initially low measurement of EMT. Further, the measurement of EMT obtained by ultrasound can change depending on the timing of the cycle, operator technique, position of the uterus, etc.

The increase in EMT was somewhat higher among the group who received oral Phalaghrita with Uttarabasti in the 2025 study in comparison to the previous study which was published in the Indian Journal of Medical Sciences. [3] The 2025 study is a comparative study and hence an addition to the literature with the reported EMT being a little higher in the group who received oral Phalaghrita along with Uttarabasti. But only 10 people were in the group in each. Therefore, the difference reported should not be viewed as a clear-cut superiority. Synergy is not guaranteed by a greater numerical difference between pre and post measurements, however. To find synergistic interaction it is necessary to have an appropriate study design and to measure statistical interaction effects.

The Shatavari trial of 2026 is a methodological improvement in the general Ayurvedic reproductive literature [4] and employed randomization, double blinding, placebo group, prospective outcome surveillance and pre-specified follow-up. The reported difference between the groups in EMT was statistically significant, and these methodological characteristics increase the internal credibility of the results as compared to the results of pilot studies conducted without controls.

However, the Shatavari study should qualify as indirect evidence to the specific review question. Participants were NOT women with thin endometrium, but women with PCOS. The clinical significance of EMT changes among women with PCOS may differ from the significance changes within the group of women with isolated thin-endometrium infertility. [5-7]

Inferior studies that investigate anovulation, PCOS, Artava Kshaya or female infertility, on the other hand, may show actions on ovulation, menstruation, metabolic parameters and others genital characteristics, but these results cannot be utilized to decide the effectiveness of treatment for thin endometrium.

Important methodological questions are highlighted: EMT and actual fertility outcomes. The intermediate or surrogate marker is EMT. With increasing EMT, it does not necessarily mean that implantation rates, clinical pregnancy, continued pregnancy or live birth will increase. The preparation of the endometrium is a complex biological phenomenon that includes structural, vascular, hormonal, molecular, inflammatory and immunological factors. Thus, it does not always require that endometrial receptivity be restored when the EMT is improved using ultrasound.

The literature on reproduction in the modern world also cautions against using absolute EMT thresholds. The predictive discrimination of EMT alone is limited and therefore a threshold should be considered as a research criterion, not a universal pathological threshold, in assisted reproductive settings.

It is hoped that concepts like Artava Kshaya, Apana Vata, Kshetra, Brimhana, and Rasayana may offer a traditional framework for understanding reproductive health, for explaining the rationale for certain treatment approaches. While useful in their own conceptual context, it is not appropriate to use these concepts as a biomedical mechanism until backed up by experimental or clinical evidence.

Similarly, proposed mechanisms involving phytoestrogenic activity, estrogen-receptor modulation, antioxidant effects, vascular changes, or tissue nourishment should be regarded as hypotheses unless directly demonstrated in appropriate experimental or human studies. The 2026 Shatavari trial demonstrates a clinical difference in EMT but does not establish the molecular mechanism responsible for that observation.[4]

The case reports provide additional clinical context.[8,9] The case described by Gambhire-Bhadugale et al. reported an increase in EMT from 6.1 to 9 mm followed by conception.[8] The case reported by Susarla et al. described conception and healthy delivery after a complex multimodal Ayurvedic treatment program.[9] Such observations are useful for hypothesis generation and documentation of clinical practice but cannot distinguish treatment effects from natural history or the effects of multiple simultaneous interventions.

There are also limited data on safety for making general statements about all Ayurvedic interventions. Although the 2026 Shatavari trial reported no serious adverse events, and equivalent number of mild-to-moderate adverse events between treatment and placebo groups, this finding cannot be extrapolated to other standardized formulations or other invasive procedures like Uttarabasti.

Adverse events should, therefore, be reported in future trials in a systematic manner, such as: procedural complications, formulation characteristics, dosage, length of treatment, batch standardization, concomitant treatment, and withdrawal due to adverse events.

Another key issue to be considered is heterogenous estimation of EMT and ultrasound timing. However, EMT can change during the menstrual cycle and future studies should detail the day of the cycle, the type of ultrasound, operator procedures, and if the thickest part of the endometrium was measured in the sagittal plane.

7. CLINICAL IMPLICATIONS

The currently available evidence does not justify recommending any Ayurvedic intervention as a proven treatment for thin-endometrium infertility.

Clinical interpretation should recognize that:

1. Direct evidence remains limited.
2. Direct studies are generally small.
3. Several interventions have been evaluated without adequate control groups.
4. Case reports cannot establish efficacy.
5. PCOS studies provide indirect rather than direct evidence for thin endometrium.
6. Ongoing registered trials should not be interpreted as positive treatment evidence.
7. Improvement in EMT should not automatically be equated with improvement in implantation or live birth.
8. Invasive procedures such as Uttarabasti require appropriate clinical expertise, infection-control procedures, informed consent, and careful patient selection.
9. Ayurvedic treatment should not delay appropriate infertility evaluation or evidence-based fertility care.

8. STRENGTHS OF THE REVIEW

There are a number of strengths to this review. It separates direct and indirect evidence, not mixing studies from differing clinical populations. Randomized clinical evidence is distinguished from uncontrolled pilot studies and case-based evidence. Continued clinical trials that are registered are noted, but not considered to be finished efficacy trials. The review does not limit the scope of the evidence base to the earlier search period and incorporates relevant evidence published during 2025 and 2026. The review specifically tackles limitations of EMT as a surrogate outcome. Last, the review does not go beyond the evidence in making efficacy and/or safety claims.

9. LIMITATIONS

The evidence is quite variable in terms of participant characteristics, infertility etiology, interventions, comparators, treatment duration, EMT assessment, and reproductive outcome. Causal attributions are limited due to the small number of studies, small sample size, and the single-arm/open-label design and the multi-component ayurvedic interventions. Selection and publication bias is a common characteristic of case reports and case studies. Furthermore, EMT is an indirect measure, and is not a true indicator of endometrial receptivity or reproductive potential. Full 2026 export files and screening logs were not available for historical PRISMA counts, which could not be reconstructed as a complete 2026 database-level search. Thus, the documented (historical) searches were separated from the additional evidence found by searches up to 2026, thereby excluding unsupported numerical PRISMA counts.

10. FUTURE RESEARCH DIRECTIONS

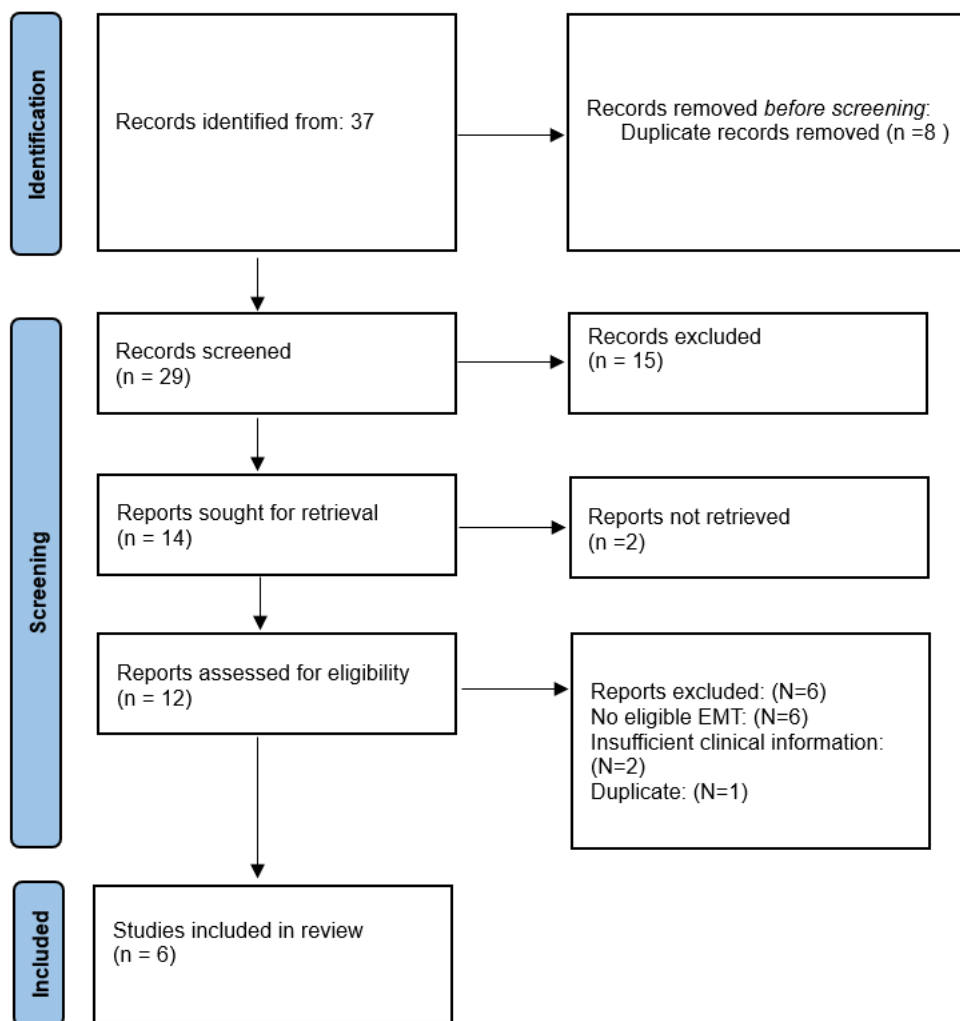
Future research should prioritize adequately powered, prospectively registered randomized controlled trials in women with objectively defined thin endometrium. Studies should standardize EMT eligibility, ultrasound timing and measurement, and report measurement reliability where feasible. Appropriate placebo, usual-care, or active comparators should be used, with predefined clinical outcomes including pregnancy, miscarriage, live birth, neonatal outcomes, and adverse events. Ayurvedic formulations

should be standardized and described in detail, including composition, dose, preparation, route, duration, batch characteristics, and whether interventions are individual or multicomponent. Multicentre recruitment, adequate follow-up, intention-to-treat analysis, and transparent reporting of protocol deviations and missing data are also recommended.

11. CONCLUSION

There are indications that certain Ayurvedic approaches may help enhance EMT and some reproductive factors, especially in some small studies involving thin endometrium. Indirect EMT evidence provided in the 2026 Shatavari RCT with women with PCOS. However, conclusions are limited because of small samples, heterogeneous and multicomponent interventions, methodological limitations, and limited fertility outcomes. Improvement with EMT is not synonymous with implantation or pregnancy or live birth. Empowerment of well-designed, adequately powered RCTs with clinically meaningful fertility outcomes and standardized interventions is needed.

PRISMA 2020 FLOW CHART



UPDATED EVIDENCE MAP THROUGH 2026

Direct Thin-Endometrium Evidence

1. Rupareliya et al. — single-arm pilot study; 15 participants.[2]
2. Tanwar et al. — randomized comparative study; 20 participants.[3]

Indirect Clinical Evidence

1. Mhatre et al. — randomized, double-blind, placebo-controlled Shatavari study in PCOS; 70 randomized participants.[4]

2. Donga et al. — anovulatory infertility study involving Nasya and Matra Basti.[5]
3. Bhingardive et al. — PCOS/Artava Kshaya clinical study.[6]
4. Balat et al. — female infertility due to anovulatory factors.[7]

Case-Based Evidence

1. Gambhire-Bhadugale et al. — thin-endometrium case study.[8]
2. Susarla et al. — secondary infertility/Artava Kshaya case report.[9]

Ongoing Registered Evidence

1. CTRI/2025/11/097011 — Gynoveda formulations in female infertility.
 2. CTRI/2026/02/103113 — Methikadya Churna in Vandhyatva with anovulatory cycles.
 3. CTRI/2026/02/103112 — Saubhagyanandana Ghrita and Balaadi Churna in Vandhyatva with endometrial receptivity.
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REFERENCES

1. Kasius A, Smit JG, Torrance HL, Eijkemans MJC, Mol BWJ, Opmeer BC, et al. Endometrial thickness and pregnancy rates after IVF: a systematic review and meta-analysis. *Hum Reprod Update*. 2014;20(4):530-541. doi:10.1093/humupd/dmu011.
2. Rupareliya JD, Donga S, Gandhi AJ. Management of Vandhyatva w.s.r. to thin endometrium through Ayurveda: a single arm open labelled pilot clinical trial. *Ayu*. 2021;42(4):156-163. doi:10.4103/ayu.ayu_132_21.
3. Tanwar S, Deepika, Manisha, Sudhi, Vasundhra, Vikrant, et al. Clinical Evaluation Of Phalaghrita Uttarbasti And Phalaghrita Uttarbasti Along With Oral Administration In The Management Of Thin Endometrium: A Randomized Controlled Study. *Afr J Biomed Res*. 2025;27(4S):1433-1440. doi:10.53555/AJBR.v28i2S.7110.
4. Mhatre Y, Jadhav P, Malik A, Srivathsan M, Langade D. Efficacy and safety of Shatavari root extract in women with Polycystic Ovarian Syndrome: a randomized, double-blind, placebo-controlled trial. *Front Endocrinol (Lausanne)*. 2026;17:1769773. doi:10.3389/fendo.2026.1769773.
5. Donga KR, Donga SB, Dei LP. Role of Nasya and Matra Basti with Narayana Taila on anovulatory factor. *Ayu*. 2013;34(1):81-85. doi:10.4103/0974-8520.115453.
6. Bhingardive KB, Sarvade DD, Bhatted S. Clinical efficacy of Vamana Karma with Ikshwaaku Beeja Yoga followed by Shatapushpadi Ghanavati in Artava Kshaya w.s.r. to polycystic ovarian syndrome. *Ayu*. 2017;38(3-4):127-132. doi:10.4103/ayu.AYU_192_16.
7. Balat G, Dei L, Donga S, Bhagora T. Effect of Brihatyadi Yapana Basti and Shivalingi (*Bryonia laciniosa* Linn.) seed powder in the management of female infertility (Vandhyatva) due to anovulatory factor: an open-labelled randomized clinical trial. *Ayu*. 2019;40(4):216-222. doi:10.4103/ayu.AYU_123_18.
8. Gambhire-Bhadugale H, Tekawade UV, Herlekar S, Kulkarni M. Treating thin endometrium by Ayurvedic medications: a case study. *Int J Ayurvedic Med*. 2022;13(4):1102-1107. doi:10.47552/ijam.v13i4.3136.
9. Susarla S, Anupama V, Sowmya G. A case report on Ayurvedic management in secondary infertility due to Artava Kshaya. *J Ayurveda Integr Med Sci*. 2024;9(5):279-283. doi:10.21760/jaims.9.5.47.
10. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71. doi:10.1136/bmj.n71.
11. Rethlefsen ML, Kirtley S, Waffenschmidt S, Ayala AP, Moher D, Page MJ, et al. PRISMA-S: an extension to the PRISMA Statement for Reporting Literature Searches in Systematic Reviews. *Syst Rev*. 2021;10(1):39. doi:10.1186/s13643-020-01542-z.

REGISTERED CLINICAL TRIALS

1. Clinical Trials Registry–India. CTRI/2025/11/097011. An open-label, single-arm, multicentric, prospective clinical study to evaluate efficacy and safety of Gynoveda Ayurvedic formulations (Poshini along with Upaja and Rutuja) in female infertility.

2. Clinical Trials Registry–India. CTRI/2026/02/103113. A randomized controlled clinical study to assess the efficacy of Methikadya Churna in Vandhyatva with special reference to anovulatory cycles.
3. Clinical Trials Registry–India. CTRI/2026/02/103112. A single-arm clinical trial to evaluate the efficacy of Saubhagyanandana Ghrita and Balaadi Churna on Vandhyatva with special reference to endometrial receptivity.

DECLARATIONS

Funding

None.

Conflict of Interest

The authors declare no conflict of interest.

Data Availability

The review is based on published literature and publicly available clinical trial registry information. No new primary participant-level data were collected.

Ethical Approval

Ethical approval was not required because this study involved secondary analysis of published literature and publicly available clinical trial-registration information.

Acknowledgments

None.