HJOG An Obstetrics and Gynecology International Journal

Research

HJOG 2024, 23 (2), 124-132 | DOI: 10.33574/HJOG.0557

Effect of Warm Fluid Distension Media in relieving Pain in outpatient Hysteroscopy: Randomized Controlled Trial

Mortada ElSayed Ahmed, Ahmed Mohamed Hashad, Rania Gamal El-Skaan, Amira Mohamed Zanoun, Nermeen Moustafa El-Ghareeb

Department of Obstetrics & Gynecology, Faculty of Medicine, Ain Shams University, Cairo, Egypt

Corresponding Author

Amira Mohamed Zanoun Abd El Wahed, Elsalam Street, Cairo, Egypt, Tel.: +20 100 073 6903, e-mail: zanounamira@gmail.com
ORCID 0009000513352691

Abstract

Objective: To detect the significance of using warm saline (body temperature 37C) as distension media in-office hysteroscopy in reducing pain.

Methods: This randomized control trial was conducted at the Early Cancer Detection and Gynecological Endoscopy Unit, Maternity Hospital, Ain Shams University, on 100 women who underwent office hysteroscopy from 1st April 2021 to 30 October 2021. Randomly, the study participants were distributed into two groups of equal number: group (A), which included 50 patients in whom warm saline (body temperature 37C) was infused inside the endometrial cavity during hysteroscopy, and group (B), which included 50 patients in whom normal saline (room temperature) were used during hysteroscopy

Results: The visual analog scale at the end of the procedure was significantly higher in group B (6.88±1.60) compared to group A (5.86±1.86) with a p-value of 0.002**.** While no statistically significant difference was found between groups regarding pain scores 15 minutes after the procedure. Also, patients in group A showed more statistically significant satisfaction than patients in group B, with a p-value of (p= 0.009). These findings indicated the superiority of warm saline to normal saline regarding pain relief.

Conclusion: Our current data confirmed the role of warm saline distention media in decreasing pain during hysteroscopy, but the long-term affection after 15 minutes needs further evaluation.

Key words: Outpatient hysteroscopy, temperature, saline

Introduction

Office hysteroscopy is a technique that uses a thin tube and a tiny camera to view what is inside the uterus without making any incisions or requiring anesthesia[1].

Various studies have considered office hyster-

oscopy the best diagnostic technique for detecting endometrial pathology[2-4]. Abnormal uterine bleeding, reproductive problems, glandular abnormalities on cervical smear, finding and removal of missed intrauterine devices, polypectomy, endometrial ablation, and myomectomy are indications for diagnostic and therapeutic outpatient hysteroscopy[4].

The endometrial cavity is distended with normal saline or carbon dioxide gas for better visualization during hysteroscopy. Normal saline is preferred for outpatient hysteroscopy due to its effectiveness and fewer vasovagal episodes[5]. Uterine walls need 40 mm Hg pressure for hysteroscopic visualization[6].

Pharmacological and nonpharmacological analgesic treatments are utilized to alleviate the discomfort associated with the hysteroscopic operation. Nonpharmacological methods, such as the vaginoscopic approach or mini hysteroscopes, can be used to avoid pain[7]. In contrast, pharmacological methods include nonsteroidal anti-inflammatory drugs (NSAIDs), which are advised to calm the pain in the postoperative period, and paracervical block, which reduces pain during and 30 minutes after hysteroscopy[8].

Instilling saline at lower temperatures is hypothesized to cause uterine contractility during saline instillation to distend the uterine cavity[9]. There is limited research on the impact of temperature on picture clarity, discomfort/ pain, treatment outcome, and patient satisfaction[10].

This study aimed to detect the significance of using warm saline (body temperature 37C) as distension media in-office hysteroscopy in reducing pain.

Patients and Methods

This randomized control trial was conducted at the Early Cancer Detection and Gynecological Endoscopy Unit, Maternity Hospital, Ain Shams University. The study gained a local ethical committee (FMASU 567/2021). Verbal consent was obtained from all participants before recruitment to the study, after an explanation of the study's purpose and procedures was given. The study was registered in clinicaltrials.gov NCT05246436.

Randomization

One opaque envelope and 100 pieces of paper were numbered in a series manner in the envelope. The matching number, which indicates the specific group, was put according to the randomization table. When the first patient came, the first piece of paper opened, and the patient was identified according to the number inside.

The study participants were divided into two groups of equal numbers: group (A), which contained 50 patients in whom warm saline (body temperature 37C) was infused inside the endometrial cavity during hysteroscopy, and group (B), which contained 50 patients in whom normal saline (room temperature) was used during hysteroscopy (Figure 1,2).

Inclusion criteria: All patients participated in the current study aged >18 years (the average starting age of marriage and starting the sexual & reproductive function in the examined population), complaining of abnormal uterine bleeding and /or

Figure 1. Digital thermometer.

undergoing the hysteroscopic procedure to assess the endocervical canal, uterine cavity, and tubal Ostia for infertility, removal of foreign body, or suspected Mullerian anomalies. We excluded 1) females with contraindications of diagnostic hysteroscopies, such as being unable to exclude pregnancy not to harm their pregnancy, acute pelvic infection not to spread the infection or causing perforation, active genital herpes, confirmed cervical or endometrial cancer not to cause bleeding and profuse bleeding at the time of the procedure as blood act against good image and resolution, 2) females who received analgesic agents on the day of the procedure as it may change the result of the study, 3) failed entry of the cervical canal requiring cervical dilatation as it adds more pain and changes the result of the study. 4) female who needs any additional procedures during the procedure: polypectomy, biopsy, and adhesiolysis as the additional procedure may add more pain, 5) females who refused to participate in the study.

In both groups, an office hysteroscopy was performed using a standard technique by (a senior gynecologist), in which a rigid hysteroscopy (continuous flow, 30 degrees forward oblique view) was assembled in a 4-mm diameter diagnostic sheath with a traumatic tip (Karl Storz Endoscopy®, Tuttlingen, Germany) and a high-intensity cold light source and fiberoptic The room temperature group's saline infusion bags were placed in the office hysteroscopy room for 30 minutes at least before the procedure, while the warmed saline

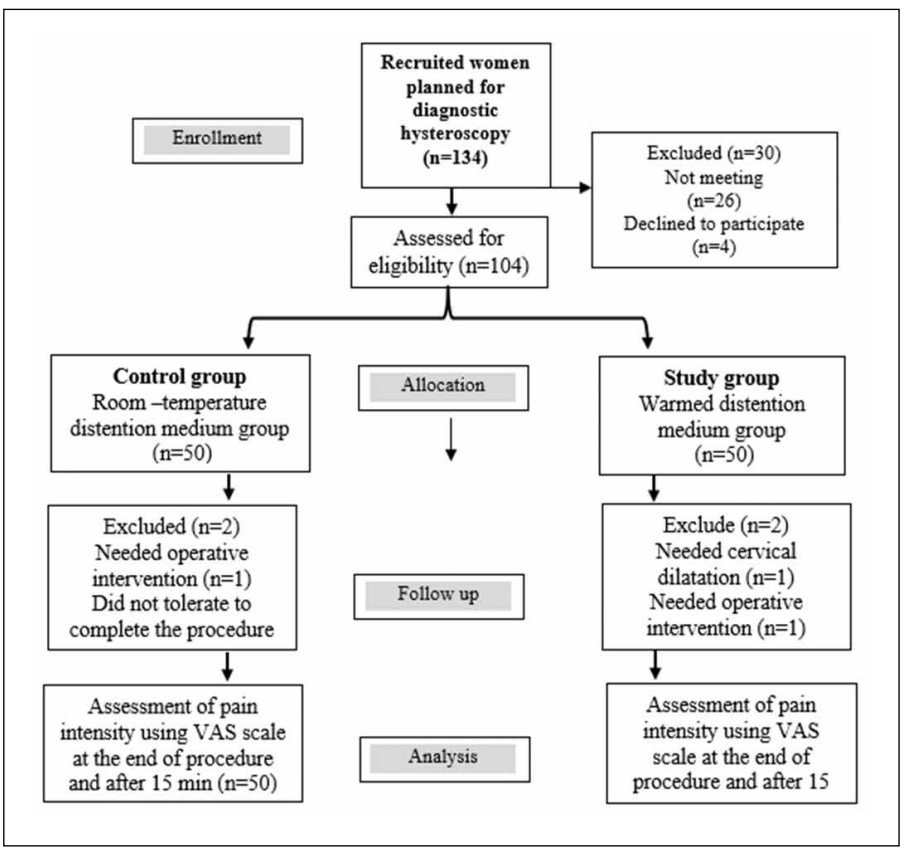

Figure 2. Consort chart showing the recruitment and han-dling of the study population during the course of the study.

groups were put in a warmed water bath to 37 C, and then the temperature confirmed using a digital thermometer[10].

The lowest pressure wished to distend the uterus cavity should be maintained. The pressure was controlled at 100-120 mmHg using an endomat. All Office Hysteroscopy procedures were performed using a vaginoscopy method rather than a speculum or a tenaculum to provide traction to the cervix.

All participants had the following: detailed history taking (personal, menstrual, obstetric, past medical &surgical history, medication history, And the history of the current complaint, general (pulse, blood pressure, and temperature), and abdominal examination (inspection and palpation of the abdomen). Local examination using a speculum to confirm the presence of inclusion & exclusion criteria. The pain was measured using a 10-cm visual analogue scale (VAS) graded from 0 to 10 according to *del Valle et al.*[7]. *a*t the end of the procedure and 15 minutes after the procedure.

The primary outcome: pain score at the end of the procedure and 15 minutes after the procedure

The Secondary outcomes: satisfaction of the patients, Indication of the procedure, Duration of the procedure (min), Clarity of view, and Ease of entry

Sample Size Justification and Calculation: Using the PASS 11 program for sample size calculation and according to *Tawfek et al. (2019*[11]*),* the expected mean VAS score at the end of the procedure in study groups = 1.64 ± 0.82 and 3.05 ± 1.17, and after 15 minutes = 0.35 ± 0.57 and 1.05 ± 0.81. A sample size of 50 women per group can determine the difference between the two groups regarding VAS score at the end of the procedure and after 15 minutes with power > 90%, setting the alpha error at 0.05.

Statistical analysis: Statistical program for social sciences, version 23.0, was used to analyze the data (SPSS Inc., Chicago, Illinois, USA). The quantitative information was presented as a mean, standard deviation, and range. An Independent-sample t-test of significance was used for comparing two means, and the Whitney U test was used for two-group comparisons in non-parametric data. Wilcoxon Signed-Rank Sum test was applied for comparing differences by time for non-parametric data Comparison between groups with qualitative data was done by using the Chi-square test and Fisher's exact test instead of the Chi-square test only when the expected count in any cell was less than 5. The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant when P-value ≤0.05.

Results

Table 1 compares group A and group B regarding baseline characteristics, menopausal status, the indication of the procedure, duration of the procedure, clarity of view, and ease of entry. The two groups showed a statistically significant difference regarding the duration of the procedure (from the time of passing of the hysteroscopy into the vagina until the time to remove it outside the cervix) with a p-value (p=0.003). The highest value was found in group A (3.70±1.92) compared to group B (2.75±1.13).

A statistically significant difference between the two groups regarding pain score at the end of the procedure was found with a p-value (p= 0.002). group B had the highest value (6.88±1.60) compared to group A (5.86±1.86). No statistically significant difference was found between the two groups regarding pain score 15min after the procedure with a p-value (p>0.05) (Table 2).

As regards patient satisfaction, a statistically significant difference between the two groups regarding patient satisfaction was found with a p-value (p= 0.009). More frequency of patient satisfaction was found in group A (58%) compared to group B (32%) (Table 3).

Regarding post-procedure complications of both

Table 1. Comparison between Group A and Group B regarding different parameters.

BASELINE CHARACTERISTICS	GROUP A (N=50)	GROUP B (N=50)	TOTAL (N=100)	TEST VALUE	P-VALUE
Age (years)					
Mean±SD	37.68±11.80	37.16±9.34	37.42±10.59	U=0.244	0.808
Range	19-76	19-58	19-76		
BMI [wt/(ht)^2]					
Mean±SD	23.00±2.57	22.58±2.40	22.79±2.48	t=0.844	0.401
Range	20-29	19-28	19-29		
Parity					
Nulli	11 (22.0%)	13 (26.0%)	24 (24.0%)	x2=0.968	0.616
Para1	13 (26.0%)	9 (18.0%)	22 (22.0%)		
Multi	26 (52.0%)	28 (56.0%)	54 (54.0%)		
Previous uterine surgeries					
Cesarean section	30/39 (76.9%)	18/37 (48.6%)	48/76 (63.2%)	x2=6.888	0.076
Curettage	7/39 (17.9%)	16/37 (43.2%)	23/76 (30.3%)		
Myomectomy	2/39 (5.1%)	3/37 (8.1%)	5/76 (6.6%)		
Previous CX. Surgery					
Cerclage	1 (2.0%)	1 (2.0%)	2 (2.0%)	FE	1.000
NAD	49 (98.0%)	49 (98.0%)	98 (98.0%)		
Menopausal status					
Post	7 (14.0%)	5 (10.0%)	12 (12.0%)	x2=0.379	0.538
Pre	43 (86.0%)	45 (90.0%)	88 (88.0%)		
Indication of the procedure					
AUB	23 (46.0%)	25 (50.0%)	48 (48.0%)	FE= 0.929	0.920
HMB	5 (10.0%)	4 (8.0%)	9 (9.0%)		
Infertility	16 (32.0%)	13 (26.0%)	29 (29.0%)		
Missed IUD	5 (10.0%)	6 (12.0%)	11 (11.0%)		
Repeated Abortion	1 (2.0%)	2 (4.0%)	3 (3.0%)		
Duration of the procedure (min)					
Mean±SD	3.70±1.92	2.75±1.13	3.22±1.64	U=3.029	0.003*
Range	1.5-10	1.5-7.5	1.5-10		
Clarity of view					
Clear	49 (98.0%)	47 (94.0%)	96 (96.0%	FE	0.307
Dim	1 (2.0%)	3 (6.0%)	4 (4.0%)		
Ease of entry					
Difficult	1 (2.0%)	1 (2.0%)	2 (2.0%)	FE	1.000
Easy	49 (98.0%)	49 (98.0%)	98 (98.0%)		

Using: Independent Sample t-test; Mann-Whitney test; x^2: Chi-square test; Fisher's Exact test
p-value >0.05 NS

Table 2. Comparison between Group A and Group B regarding pain score.

PAIN SCORE	GROUP A (N=50)	GROUP B (N=50)	TOTAL (N=100)	TEST VALUE	P-VALUE
At the end of the procedure					
Mean±SD	5.86±1.86	6.88±1.60	6.37±1.80	-3.123	0.002*
Range	3-10	3-10	3-10		
At 15min after the procedure					
Mean±SD	1.22±1.45	1.60±1.44	1.41±1.45	-1.487	0.137
Range	0-5	0-4	0-5		

Using: U=Mann-Whitney test
p-value >0.05 NS; *p-value <0.05 S

Table 3. Comparison between Group A and Group B regarding patient satisfaction.

PATIENT SATISFACTION	GROUP A (N=50)	GROUP B (N=50)	TOTAL (N=100)	TEST VALUE	P-VALUE
No	21 (42.0%)	34 (68.0%)	55 (55.0%)	6.828	0.009*
Yes	29 (58.0%)	16 (32.0%)	45 (45.0%)		

Using: x^2: Chi-square test; *p-value <0.05 S

techniques, no complication was reported in both groups.

Discussion

Our Results and their interpretation

In the current study, group B showed a significantly higher VAS score at the end of the procedure (6.88±1.60) compared to group A (5.86±1.86) with a p-value of 0.002. While no statistically significant difference was found between the two groups regarding pain score 15 min after the procedure. Also, group A patients showed significantly higher satisfaction than patients in group B with a p-value of (p= 0.009). These findings indicated the superiority of warm saline to normal saline as regards pain relief.

On the other hand, we reported a significantly prolonged duration of the procedure in group A more than in group B (3.70±1.92 vs 2.75±1.13, p=0.003).

Comparison of our results to similar studies

Salazar et al. (2019) studied 48 patients undergoing surgical hysteroscopy. The study found no significant differences in pain scores between patients who received normal saline fluid bags at room temperature, those warmed in a cabinet before use, or those maintained at a constant 40°C[13]. Unlike our study, Salazar et al[13]. used intravenous sedation during operative hysteroscopy, which may have affected pain assessment. Furthermore, the chosen temperature of 40°C was not physiological.

In a study by Evangelista et al.[9], 64 women undergoing hysteroscopy were randomly assigned to two groups. One group received a warmed saline distension medium, while the other received saline at room temperature. Pain severity was measured using a visual analogue scale at three points, with no significant difference observed between the two groups.

The study by Evangelista et al. may have some contradictions due to limitations. The hysteroscopic examinations were not all diagnostic only, and there was high variability in warm temperatures using a microwave oven. In contrast, our study used a

thermostatically controlled incubator. Additionally, in our study, the pressure was controlled at 100-120 mmHg using a tndomat to maintain the pressure at the lowest value required to distend the uterine cavity, which is a significant variable contributing to pain during hysteroscopy[14].

In a 2008 clinical trial by Almeida et al., two groups of women underwent diagnostic hysteroscopy using different approaches. One group used warm saline as the distension medium, while the other used CO2. The warm saline group reported significantly lower pain scores (1.60) compared to the CO2 group (3.39) ($p<0.001$). Lower pain scores were also observed after 5, 10, and 15 minutes ($p<0.001$) and after 20 minutes ($p=0.056$). However, the study's major limitation was that the two groups used different methods, making it difficult to compare the results[15].

It was found in the current study that using a warmed saline solution at 37°C resulted in lesser pain during hysteroscopy due to the reduction in the stimulus for uterine contractility. However, it should be noted that the temperature of the medium used for distension is not the only source of pain as other factors can also cause discomfort. Inserting a hard device (hysteroscope) can be uncomfortable especially in cases of underlying uterine diseases such as cervical inflammation or uterine fibroids. Additionally, the study found that the clarity of view and ease of entry were statistically equivalent in both study groups, which is a parameter that neither Evangelista et al.[9] nor Almeida et al.[15] had previously mentioned.

Sharma et al. (2022)[16], conducted double-blinded prospective research of 100 patients in a specialized office hysteroscopy center. Both control and study groups had similar demographics and statistically equivalent outcome data. The average post-procedural pain scores at 5 minutes were lower in the warmed saline group, but not statistically significant.

Like the current study, *Shika et al.*[16] revealed that the clarity of view, ease of Entry, and patient satisfaction were statistically similar in both study

The study's strengths include the fact that only a few studies have addressed the different effects of the temperature of hysteroscopic distention media in pain management and the fact that this is a well-organized RCT that took place in a tertiary center with consultants performing the procedures.

The present study has some limitations. First, it was conducted in a single institution. Second, warmed saline distention medium was not assessed in lengthy, painful operative hysteroscopic interventions.

Clinical implications of the study: We encourage the use of warm saline (at body temperature of 37°C) as a distension medium during in-office hysteroscopy to reduce patients' pain.

Recommendation for future research: Further studies are needed to evaluate the effect of temperature and different distension media on pain management during hysteroscopic procedures.

Conclusion: Our current data confirmed the role of warm saline distention media in decreasing pain during hysteroscopy, but the long-term affection after 15 minutes needs further evaluation.

Authors contribution

M.E.A: Conceptualization, Data curation, Formal Analysis, Funding acquisition

A.M.H ; Investigation, Methodology, Project administration, Software.

R.G.E: Supervision, Validation, Visualization

A.M.Z: Writing – original draft, Writing – review & editing

N.M.E: Conceptualization, Data curation, Formal Analysis, Writing – original draft, Writing – review & editing

Funding

This research received no external funding.

Study Registration

The study was registered in clinicaltrials.gov NCT05246436.

Disclosure of Interest

The authors declare no conflict of interest.

Ethics Approval

Following local regulations, the protocol gained ethical and research approval from the Faculty of Medicine Ain Shams University FMASU MS 567/2021

Informed Consent

All patients gave their informed consent after explaining the whole procedure. We Confirm that all methods were performed according to the relevant guidelines and regulations according to the Declaration of Helsinki.

Data Sharing

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Acknowledgment

Not applicable.

References

1. Campo R, Santangelo F, Gordts S, Di Cesare C, Van Kerrebroeck H, De Angelis MC, et al. Outpatient hysteroscopy. Facts Views Vis Obgyn. 2018;10(3):115-122. PMID: 31191845; PMCID: PMC6548410.
2. Bar-On S, Ben-David A, Rattan G, Grisaru D. Is outpatient hysteroscopy accurate for the diagnosis of endometrial pathology among perimenopausal and postmenopausal women? Menopause. 2018 Feb;25(2):160-164. doi: 10.1097/GME.0000000000000961.
3. Ma T, Readman E, Hicks L, Porter J, Cameron M, Ellett L, et al. Is outpatient hysteroscopy the new gold standard? Results from an 11 year prospective observational study. Aust N Z J Obstet Gynaecol. 2017;57(1):74-80. doi: 10.1111/ajo.12560.
4. Daniilidis A, Pantelis A, Dinas K, Tantanasis T, Loufopoulos PD, Angioni S, et al. Indications of diagnostic hysteroscopy, a brief review of the literature. Gynecol Surg. 2012;9(1):23-8. DOI 10.1007/s10397-011-0695-3
5. Abdallah KS, Gadalla MA, Breijer M, Mol BWJ. Uterine distension media for outpatient hysteroscopy. Cochrane Database Syst Rev. 2021; 26;11(11):CD006604. doi: 10.1002/14651858.CD006604.
6. Riemma G, Schiattarella A, Colacurci N, Vitale SG, Cianci S, Cianci A, De Franciscis P. Pharmacological and non-pharmacological pain relief for office hysteroscopy: an up-to-date review. Climacteric. 2020;23(4):376-383. doi: 10.1080/13697137.2020.1754388.
7. del Valle C, Solano JA, Rodríguez A, Alonso M. Pain management in outpatient hysteroscopy. Gynecology and Minimally Invasive Therapy. 2016;5(4):141-7. doi.org/10.1016/j.gmit.2016.08.001
8. Abbas AM, Samy A, El-Naser Abd El-Gaber Ali A, Khodry MM, Ahmed MAM, El-Rasheedy MI, et al. Medications for pain relief in outpatient endometrial sampling or biopsy: a systematic review and network meta-analysis. Fertil Steril. 2019;112(1):140-148.e12. doi: 10.1016/j.fertnstert.2019.03.028.
9. Evangelista A, Oliveira MA, Crispi CP, Lamblet MF, Raymundo TS, Santos LC. Diagnostic hysteroscopy using liquid distention medium: comparison of pain with warmed saline solution vs room-temperature saline solution. J Minim Invasive Gynecol. 2011;18(1):104-7. doi: 10.1016/j.jmig.2010.09.009
10. Kapur S, Gruber A, Sekar H, Mafuta J, Lodhi W,

Sivashanmugarajan V, et al. Does temperature of distending medium matter in outpatient hysteroscopy? A double-blinded cohort control observational study of room temperature versus warmed saline. J Obstet Gynaecol Res. 2020;46(3):485-489. doi: 10.1111/jog.14207.

11. Tawfek M, Hemeda H, Ibrahim M. Effectiveness of warm saline distension media on relieving pain in outpatient office hysteroscopy: a randomized controlled clinical trial. Gynecol Reprod Med. 2019;3:1-7. DOI: 10.33140/JGRM
12. Umranikar S, Clark TJ, Saridogan E, Miligkos D, Arambage K, Torbe E, et al.British Society for Gynaecological Endoscopy /European Society for Gynaecological Endoscopy Guideline Development Group for Management of Fluid Distension Media in Operative Hysteroscopy. BSGE/ESGE guideline on management of fluid distension media in operative hysteroscopy. Gynecol Surg. 2016;13(4):289-303. doi: 10.1007/s10397-016-0983-z..
13. Salazar CA, Wong MC, Miller VE, Morris SN, Isaacson KB. The effect of warmed hysteroscopic fluid-distention medium on postoperative core body temperature: a randomized trial. J Gynecol Surg. 2019;35(4):239-45. 10.1089/gyn.2018.0109
14. Marabini A, Stefanetti M, Del Vecchio C, Bovicelli L. Acceptability and pain of outpatient hysteroscopy. J Am Assoc Gynecol Laparosc. 2000;7(1):71-5. doi: 10.1016/s1074-3804(00)80012-2.
15. Almeida ZM, Pontes R, Costa Hde L. Avaliação da dor na histeroscopia diagnóstica por vaginoscopia utilizando-se, como meio de distensão, solução salina à temperatura corporal: Ensaio clínico randomizado [Evaluation of pain in diagnostic hysteroscopy by vaginoscopy using normal saline at body temperature as distension medium: a randomized controlled trial]. Rev Bras Ginecol Obstet. 2008 Jan;30(1):25-30. Portuguese. doi: 10.1590/s0100-72032008000100005.
16. Sharma S, Roy KK, Rai R, Zangmo R, Malhotra N, Das A. Assessment of Pain at Different Steps of Diagnostic Hysteroscopy Using Room Temperature Normal Saline versus Warmed Normal Saline Solution as Distension Medium: A Randomized Controlled Trial. Gynecol Minim Invasive Ther. 2022 Feb 14;11(1):41-46. doi: 10.4103/GMIT.GMIT_5_21.

Received 26-02-24
Revised 12-03-24
Accepted 18-03-24