Original Article

Effect of topical xylocaine for pain relief during hysterosalpingography among infertile women in Zaria, Nigeria: A randomized controlled trial

Anisah Yahya, Nafisa Bello[1], Hajara Umaru-Sule, Aminatu Makarfi Umar, Halima Mono Muhammad[1], Philip Oluleke Ibinaiye[1]

Departments of Obstetrics and Gynaecology and [1]Radiology, Ahmadu Bello University Teaching Hospital, Zaria, Nigeria

Abstract

Background/Aim: Hysterosalpingography (HSG) is a radiological procedure that is used to assess the patency of the female genital tract. It is a routine procedure for evaluating female factor infertility in our environment where the incidence of tubal factor infertility is high. It is associated with varying degrees of discomfort and pain. The study aimed at comparing the efficacy of topical analgesia to a placebo for providing pain relief in women undergoing HSG as workup for infertility.

Subjects and Methods: The study was a double-blind, parallel group randomized controlled trial of 117 infertile women who had HSG at the Ahmadu Bello University Teaching Hospital, Zaria, from February to December 2019. The intervention group ($n = 59$) and the control ($n = 58$) had 15 ml of 2% xylocaine gel and 15 ml of K-Y jelly (placebo) applied directly on their uterine cervical lip, respectively. The primary outcome measure was the mean Visual Analog Scale (VAS) for pain perception on each group during HSG at the point of cervical manipulation and uterine filling with contrast.

Results: The mean VAS scores for pain perception in the xylocaine group during cervical manipulation and uterine filling were 2.3 (0.24) and 3.5 (0.35), respectively, while the scores for the placebo group during cervical manipulation and uterine filling were 7.1 (1.8) and 5.5 (0.32), respectively. The observed difference was statistically significant ($P \leq 0.001$).

Conclusion: During HSG of infertile women in Zaria, Nigeria, the use of topical xylocaine on the uterine cervix was associated with decreased pain perception during cervical manipulation and uterine filling with contrast when compared to placebo.

"Trial registry: Www.clinicaltrials.gov, Identifier NCT03802032."

Keywords: Hysterosalpingography, pain, topical xylocaine

Address for correspondence: Dr. Anisah Yahya, Department of Obstetrics and Gynaecology, College of Medical Sciences, Ahmadu Bello University/ Ahmadu Bello University Teaching Hospital, Zaria, Nigeria.
E-mail: anisahy@yahoo.com

Submitted: 26-Mar-2020 **Revised:** 04-Aug-2020 **Accepted:** 12-Mar-2021 **Published:** 22-Apr-2021

Access this article online	
Quick Response Code:	Website: www.wajradiology.org
	DOI: 10.4103/wajr.wajr_9_20

How to cite this article: Yahya A, Bello N, Umaru-Sule H, Umar AM, Muhammad HM, Ibinaiye PO. Effect of topical xylocaine for pain relief during hysterosalpingography among infertile women in Zaria, Nigeria: A randomized controlled trial. West Afr J Radiol 2021;28:8-14.

INTRODUCTION

Hysterosalpingography (HSG) is a radiological procedure that is used to assess the patency of the female genital tract during female infertility workup. Tubal disease is one of the commonest causes of female factor infertility. It accounts for up to 67% of cases of secondary infertility in some sub-Saharan African clinical settings.[1]

HSG is routinely performed in the workup for female infertility,[2] especially in an environment like ours where laparoscopy and dye test are not readily available. Specificity and sensitivity of HSG in detecting tubal disease have been reported to range from 63% to 92.1% and 86.7% to 89.3%, respectively.[3]

It is done as an outpatient procedure and has been associated with varying degrees of discomfort and pain to the patients.[4,5] Grasping the cervix and manipulating the cervix to insert the Leech-Wilkinson cannula can cause pain. In addition, uterine distension by the contrast medium and also presence of the contrast medium within the peritoneum can be painful. Release of prostaglandins from the cervix following manipulations can also cause pain.

Different types of analgesia have been used to prevent pain during HSG.[6] However, up to date, there is no standard protocol for pain relief for clients undergoing HSG. Opioids and nonopioids analgesics have been used in oral and parenteral formulations for pain relief in HSG with different effects observed.[6,7] Local anesthetic agents have also been used as topical creams, gels, spray, or by local cervical infiltration.[4,8-10] Recently, the use of immersive virtual reality as analgesia for women during HSG is being explored.[11] However, the trial is still on going.

The authors have differed widely with regard to the efficacy of different forms of analgesia for pain relief in HSG. A Cochrane review on pain relief in HSG[6] reviewed 23 trials involving 1272 women. The review compared the effectiveness of different types of pharmacological interventions for pain relief in women undergoing HSG for investigation of subfertility. The authors concluded that topical anesthetic applied before the procedure may be associated with effective pain relief during HSG; however, the quality of evidence is low. Intravenous opioids were reported to also be effective in pain relief, though this must be weighed against their side effects and their effects on the recovery time. The review also stated that there was insufficient evidence to draw conclusions on the efficacy of other analgesics for HSG or to reach any other conclusions regarding adverse effects. Thus, there is a need for more trials to have more evidence with regard to the effectiveness of pharmacological interventions for pain relief in women undergoing HSG for investigations of infertility.

Infertility is one of the most common gynecological conditions seen in our center and HSG is routinely done in our center as part of evaluation for female infertility. Despite this, there is no standard protocol for pain relief in HSG in our center, with each team giving analgesia at their discretion. In most cases, intramuscular diclofenac is given for analgesia before the procedure. In some instances, Buscopan is added as an antispasmodic and analgesic. Oral paracetamol, ibuprofen, or diclofenac is given for breakthrough pain.

This study aimed at comparing the efficacy of topical 2% xylocaine gel to a placebo for pain relief in women undergoing HSG for investigation of infertility. Clients' satisfaction and adverse effects were also reported.

SUBJECTS AND METHODS

Study design

The study was a parallel-arm double-blind randomized controlled trial with equal ratio allocation (1:1).

Participants

This included all consenting women that were requested to do a hysterosalpingogram as part of an evaluation for infertility. Women who present for HSG for other indications apart from infertility and those with a history of allergy to xylocaine and/or K-Y jelly were excluded from the study.

The study participants were recruited from the infertility clinic of the Gynecology unit of Ahmadu Bello University Teaching Hospital, Zaria, Nigeria, and the procedures were done at the Department of Radiology of the Hospital. A total of 3 senior registrars and 2 consultants in the department of Radiology Ahmadu Bello University Teaching Hospital, Zaria, performed all hysterosalpingographies.

Ethical clearance was obtained from the Health Research and Ethics Committee of the Ahmadu Bello University Teaching Hospital, Zaria (Ethical certificate number ABUTH/HREC/D13/2018).

Interventions

After obtaining informed written consent, a detailed explanation about the Visual Analog Scale (VAS) for pain was given to the participants including a pictorial explanation of the scale. The procedure was explained to the participant by a female nurse and their anxieties were

allayed. Baseline demographic and clinical parameters were then obtained from the participants.

The participants were requested to empty their bladder and then positioned in the dorsal position on a couch in the procedure room. After wearing sterile gloves and cleaning the vulva with a chlorhexidine swab, an appropriately sized bivalve, self-retaining speculum was inserted into the vagina and manipulated to expose the cervix.[12] The study drug was then applied directly on the anterior and posterior lips of the cervix. The speculum was removed after drug application. Participants were then allowed to lie comfortably on the couch before the procedure was commenced.

Group A was the study group and had topical analgesia in the form of 2% xylocaine (20 mg lidocaine Hcl/ml) gel. Fifteen milliliter of the drug was applied directly on the anterior and posterior lips of the cervix using a vaginal applicator.

Group B was the control group and had a placebo in form of a water-based lubricant containing mainly glycerol (glycerine) and hydroxyethyl cellulose produced by Reckitt Benckiser (K-Y Jelly®). Fifteen milliliter of the drug was applied directly on the anterior and posterior lips of the cervix using a vaginal applicator.

The procedure for HSG was commenced 30 min after application of the study drug. Participants were then requested to lie supine on the table with knees flexed and legs abducted. The vulva was cleaned again with chlorhexidine. A speculum was then passed to expose the cervix. A Vulsellum forceps was used to hold the cervix. A cannula was then inserted into the cervical canal for contrast injection. The contrast medium was then injected slowly into the uterine cavity under intermittent fluoroscopic evaluation after ensuring all air bubbles from the syringe and cannula were expelled.[13]

Outcome assessment

The outcome for the study was pain score at prespecified periods during the procedure, patient satisfaction with the procedure, and side effects of a drug used.

The VAS for pain rating was used to evaluate pain on a scale of 0 (no pain) to 10 (worst possible pain).[14] The VAS score with facial expression was printed on a paper on a scale of 0 to 10. A detailed explanation about the VAS and its application was given personally to each woman before the procedure indicating how the numbers correspond to levels of pain during the procedure. Participants were requested to explain the process back to the researchers to ensure that they can adequately rate pain perceived during the procedure. This process was done by the principal researcher and the research assistants.

A 5-point Likert scale was used to assess participants' satisfaction with the procedure. Satisfaction was graded as: 1 – very dissatisfied, 2 – dissatisfied, 3 – neither dissatisfied nor satisfied, 4 – satisfied, and 5 – very Satisfied.

The side effects that we assessed were local vaginal irritation and anaphylactic reaction immediately after the procedure and then during followup in the gynecology clinic.

Primary outcome

Pain assessment was done during the procedure at the following steps:

1. During cervical manipulation (application of tenaculum and cannula)
2. During uterine filling with contrast medium.

Secondary outcome

1. Mean VAS score at speculum insertion
2. Mean VAS score at the end of the procedure immediately after withdrawal of speculum and cannula
3. Mean VAS score 30 min after completing the procedure and also adverse effects
4. Patients' satisfaction with the procedure which was obtained by a 5-point Likert scale
5. Any side effect (local vaginal irritation and anaphylactic reaction).

Sample size determination:

The formula below was used to calculate the sample size.

$$n = \frac{(Z\alpha + Z\beta)^2 S^2}{d^2}$$

Standard deviation of mean pain score of 3.1 was used (4). A difference in mean pain score of 1.5 was considered significant in this study.[4]

With an estimated attrition rate of 10%, the sample size (n) was calculated to be 60 per group.

Randomization

The WINPEPI version 11.65 software was used to generate the table of random numbers (Abramson, J.H. WINPEPI updated: computer programs for epidemiologists, and their teaching potential. Epidemiologic Perspectives & Innovations 2011, 8:1). The numbers 001–120 were randomly allocated to two Groups A and B. Group A was the study group and Group B was the control group.

Each number from the table of random numbers was copied on separate paper and then sealed in a brown envelope. The envelopes were then kept inside a box after shuffling.

Participants were enrolled at the reception of the department of radiology as they presented for HSG. After obtaining written informed consent, they were requested to pick one of the brown envelopes with the study number. Once a participant picked an envelope, they were referred to the research assistant who assigned them to the study groups based on the random number picked.

Blinding

The principal investigators and the participants were blinded for the study. After enrolling participants and allocation to an intervention group, an independent research assistant (a nurse) applied the drug to the cervix using an aseptic technique. The procedure (HSG) was then commenced 30 min of application of the intervention with the standard operative procedure.

The outcome was assessed by the researchers during and after the procedures and also in the gynecology clinic.

Statistical methods

Data were analyzed using the Statistical Package for the Social Sciences version 23.0 (IBM SPSS Statistics for windows, version 23.0. Armonk, NY: IBM Corp.). Student *t*-test was used to analyze continuous data and Chi-square test was used to analyze categorical data. $P < 0.05$ was considered to be significant.

RESULTS

Recruitment, follow-up, and results

The study was conducted from February to December 2019. A total of 120 eligible women were randomized equally into the study groups. However, a total of 117 participants were eventually analyzed [Figure 1]. Participants were followed up in the gynecology clinic with their results. Side effects were assessed during follow-up.

Table 1 shows that the basic characteristics of participants were similar between the xylocaine and the placebo groups of the study ($P > 0.05$). The mean ages of participants in the xylocaine group and the placebo were 29.5 (SD 0.8) and 30.0 (SD 0.9), respectively. Most of the participants had a secondary school leaving certificate as the highest level of education attained in both the xylocaine group (49.2%) and the placebo group (37.9%). The mean duration of infertility in years in the xylocaine group and placebo group was 5.8 (SD 0.7) and 7.6 (SD 0.8), respectively.

Table 2 shows the outcome measures for the study. The mean VAS scores in the xylocaine group during cervical manipulation and uterine filling with contrast were 2.3 (0.24) and 3.5 (0.35), respectively, while that for the placebo group, they were 7.1 (1.8) and 5.5 (0.32), respectively. The

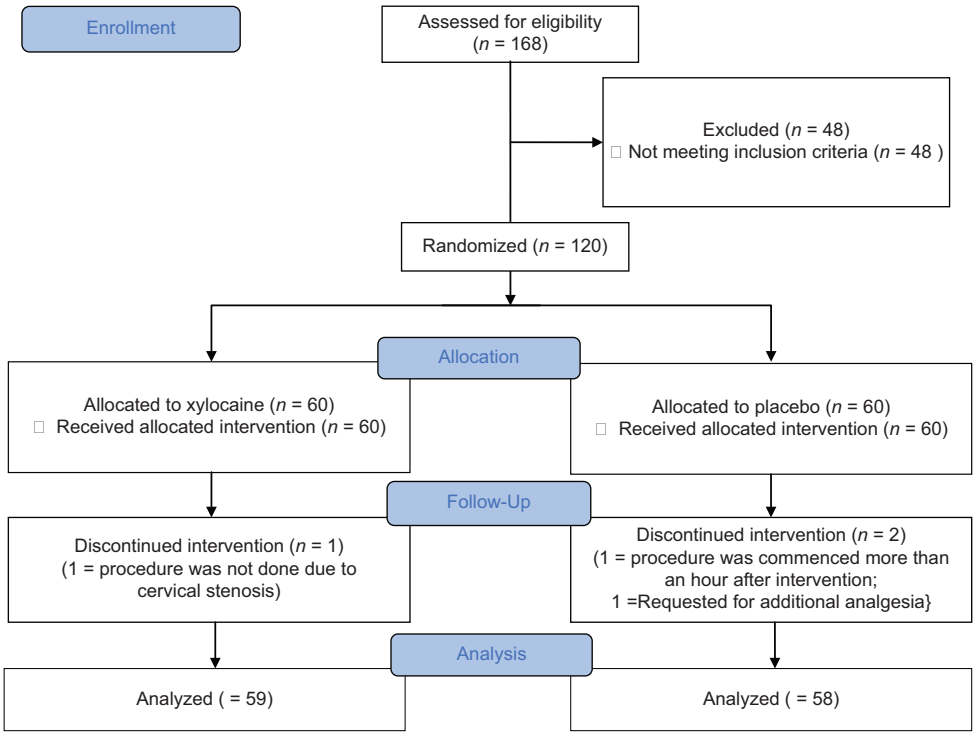

Figure 1: Participants flow chart

difference was statistically significant ($P \leq 0.001$). Among the secondary outcome measures, no statistically significant difference was observed in the mean VAS score after removing the procedure instruments and 30 min after the procedure $P > 0.05$. However, the mean VAS score during speculum insertion was significantly ($P = 0.02$) lower in the xylocaine-treated group 1.5 (0.20) when compared with the group who had a placebo of 2.2 ($P = 0.20$).

Table 3 shows the distribution of participants in both the groups by their level of satisfaction with the procedures. In all, 69.5% (41/49) of participants in the xylocaine group were satisfied with the procedure when compared to 19% (11/48) participants in the placebo group (risk ratio [RR] = 3.7, confidence interval [CI] 95%: 2.1–6.4, $P \leq 0.001$).

Table 4 shows the side effects of the drugs among participants. None of the participants in either group developed any side effects during and after the procedure.

DISCUSSION

The mean ages of participants in the xylocaine-treated group and the placebo group were 29.5 (SD 0.8) and 30.0 (SD 0.9) years, respectively. This is similar to the mean age reported from other studies done among women with infertility[15] and also studies done on pain relief during HSG among women with infertility.[4,16] There were no statistically significant differences in age, tribe, level of education, parity, and type and duration of infertility between the xylocaine-treated group and the placebo group [Table 1]. This means that both the groups are similar and comparable.

In general, the mean VAS scores were higher in the placebo group when compared to the xylocaine-treated group at all steps of the procedure and 30 min after the procedure [Table 1]. The uterine filling stage of the procedure (Step 3) was associated with the highest mean VAS score in the xylocaine-treated group followed by the cervical manipulation stage (Step 2), whereas in the placebo group, the mean VAS score was highest during cervical manipulation (Step 2) followed by the uterine filling stage of the procedure (Step 3). Cervical instrumentation and uterine filling have been reported to be the most painful steps during HSG, with uterine filling being more painful.[4,7,16] The finding that the xylocaine group in this study had the lowest VAS score during cervical instrumentation may be due to the fact that the group had analgesia directly applied to the cervix. The differences in the mean VAS scores during cervical manipulation and uterine filling between the xylocaine-treated group and the placebo group were also statistically significant ($P \leq 0.001$ and <0.00 1 respectively) [Table 2]. In a similar study by Liberty *et al.*,[16] topical lidocaine–prilocaine (EMLA) cream was found to be associated with a significant reduction in pain during cervical instrumentation when compared to a placebo. Kalantari *et al.* also reported lower pain scores during cervical manipulation among a topical lidocaine–prilocaine (EMLA) cream-treated group (5.1 ± 3.1) when compared to the placebo group (5.6 ± 2.3), but the difference in the pain scores between the groups was not statistically significant ($P = 0.06$).[4] The fact that the studies were done in different clinical settings with women from different ethnic backgrounds may account for this difference.

Unlu *et al.*[7] did a multi-arm randomized trial to determine the effect of different types of analgesia on the mean pain score during HSG. They reported that the use of lidocaine cream on the posterior fornix and lidocaine injection on the cervix is associated with a significant reduction in pain

Table 1: Sociodemographic data and reproductive profile of participants

Characteristics	*n*	Placebo, *n* (%)	*P*
Age (mean±SD)	29.5±0.8	30.0±0.9	0.724
Level of education			
Primary	5 (8.4)	11 (19)	0.260
Secondary	22 (37.3)	21 (36.2)	
Secondary	29 (49.2)	22 (37.9)	
Other	3 (5.1)	4 (6.9)	
Tribe			
Hausa	33 (55.9)	33 (56.9)	0.328
Yoruba	6 (10.2)	3 (5.2)	
Igbo	4 (6.8)	1 (1.7)	
Others	16 (27.1)	21 (36.2)	
Parity (mean±SD)	0.6±0.16	0.5±0.13	0.845
Type of infertility			
Primary	32 (54.2)	28 (48.3)	0.323
Secondary	27 (45.8)	30 (51.7)	
Duration of infertility (mean±SD)	5.8±0.7	7.6±0.8	0.95

SD – Standard deviation

Table 2: Visual analog score of participants

Procedure	Xylocaine, mean (SE)	Placebo, mean (SE)	*P*
After application of speculum (step 1)	1.5 (0.20)	2.2 (0.25)	0.02*
During cervical manipulation (step 2)	2.3 (0.24)	7.1 (1.8)	<0.001*
During uterine filling with contrast medium (step 3)	3.5 (0.35)	5.5 (0.32)	<0.001*
After withdrawal of speculum and catheter (step 4)	1.7 (0.2)	2.2 (0.20)	0.24
Thirty minutes after completing the procedure (step 5)	1.1 (0.18)	1.3 (0.17)	0.30

*Significant statistically. SE – Standard error

Table 3: Satisfaction score for participants

Likert scale	Xylocaine, *n* (%)	Placebo, *n* (%)	*P*
Very dissatisfied	2 (3.4)	9 (15.5)	<0.001*
Dissatisfied	6 (10.2)	18 (31)	
Neither dissatisfied nor satisfied	10 (17.0)	20 (34.5)	
Satisfied	24 (40.6)	11 (19)	
Very satisfied	17 (28.8)	0 (0)	

*Significant statistically

Table 4: Side effect of drugs among participants

Side effects	Xylocaine		placebo	
	Yes, *n* (%)	No, *n* (%)	Yes, *n* (%)	No, *n* (%)
During procedure				
Vaginal irritation	0	59 (100)	0	58 (100)
Anaphylactic reaction	0	59 (100)	0	58 (100)
During procedure				
Vaginal irritation	0	59 (100)	0	58 (100)
Anaphylactic reaction	0	59 (100)	0	58 (100)

during the step of uterine filling. In a Cochrane review on pain relief in HSG,[6] a meta-analysis of seven randomized controlled trials was done on topical anesthetic versus placebo or no treatment. Out of the seven trials, only four trials involved applying the topical anesthetic to the cervix which is what we did in this study. They reported reduced pain and discomfort when the topical anesthetic is applied prior to the procedure when compared to placebo or no treatment; however, the quality of evidence was low. This study also reported reduced pain scores during HSG with the use of topical anesthesia prior to the procedure when compared with a placebo.

With regard to the secondary outcomes of this study, the use of topical anesthesia prior to HSG was associated with reduced pain score during speculum application [Table 2]. Similar studies have reported lower mean VAS scores during speculum application among the study group that had topical analgesia during HSG when compared to a placebo; however, the difference was not statistically significant.[4,16]

The mean VAS score after removing procedure instruments was low in both the xylocaine-treated group and the placebo group with the xylocaine group having a lower value than the placebo group. However, the difference was not statistically significant[Table 2]. The same finding has been reported by other authors.[4,13] A Cochrane review[6] concluded that there was no evidence of a difference in the mean VAS score within 30 min after HSG between topical anesthetic and placebo or no treatment groups; however, the quality of evidence was very low.

The mean VAS score 30 min after the procedure was also low in both the xylocaine-treated group and the placebo group with the xylocaine group having a lower value than the placebo group. However, the difference was not statistically significant. This finding is also in keeping with what was found in the existing literature.[4,6,16]

None of the participants in the xylocaine-treated and placebo group had any side effects of local vaginal irritation or anaphylactic reaction during the procedure and follow-up period in the gynecology clinic.

Patients' satisfaction with the procedure was higher in the xylocaine-treated group when compared with the placebo-treated group in this study[Table 3]. The xylocaine-treated group had a lower pain score during the procedure and had a higher satisfaction rate with the procedure when compared with the placebo group (RR = 3.7, CI 95%: 2.1–6.4, $P \leq 0.001$). This means that the patients who had topical xylocaine prior to HSG were 3.7 times more likely to be satisfied with the procedure than those who were given the placebo. Patients' satisfaction with the procedure was not reported in the Cochrane review on pain relief in HSG.[6] A trial that compared cervical benzocaine versus placebo spray for pain relief in HSG reported patient satisfaction on a 3-point satisfaction score of being "satisfied," "highly satisfied," or "extremely satisfied." Unlike this study where a lower pain score was associated with higher satisfaction, they reported that satisfaction was not correlated with pain score.[10] The fact that the study[10] used a different satisfaction scale from the satisfaction scale used in this study and also reported that benzocaine spray does not decrease pain or expedite resolution of pain during HSG may explain the difference in findings from this study.

Limitation

The main limitation of this study is the fact that pain perception is subjective, but the randomized nature of the study should have minimized this effect. On the other hand, the VAS used for the assessment of pain in the study participants is a reliable tool for the assessment of pain.

CONCLUSION

Topical xylocaine on the ectocervix before HSG was associated with a significantly lower perception of pain by women during speculum application, cervical instrumentation, and uterine filling phases of the procedure when compared to women who received KY Jelly, with contrast during HSG without side effects. Furthermore, the use of xylocaine before HSG was associated with better patient satisfaction when compared to the placebo group. Thus, the use of topical xylocaine on the women's cervix can provide simple, safe, and effective pain relief during HSG of women in Zaria and related populations.

"Trial registry: www.clinicaltrials.gov, Identifier NCT03802032."

Acknowledgement

The authors would like to thank Nuhu Omeiza, Department of Radiology, Ahmadu Bello University Teaching Hospital, Shika-Zaria, and Chibuike Nnadozie Onyesoh, Department of Radiology, Ahmadu Bello University Teaching Hospital, Shika-Zaria, for their support to this article.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Idrisa A, Ojiyi E. Pattern of infertility in Northeastern Nigeria. Trop J Obs Gynaecol 2000;17:27-9.
2. Adesiyun AG, Ameh CA, Eka A. Hysterosalpingographic tubal abnormalities and HIV infection among black women with tubal infertility in sub-Saharan Africa. Gynecol Obstet Invest 2008;66:119-22.
3. Foroozanfard F, Sadat Z. Diagnostic value of hysterosalpingography and laparoscopy for tubal patency in infertile women. Nurs Midwifery Stud 2013;2:188-92.
4. Kalantari M, Zadeh Modares S, Ahmadi F, Hazari V, Haghighi H, Chehrazi M, *et al*. Randomized double-blind clinical trial of eutectic mixture of local anesthetic creams in reducing pain during hysterosalpingography. Iran J Radiol 2014;11:e10513.
5. Park A, Quaas AM, Hansen KR, Porter B, Burks H, Craig LB. Predictors of pain associated with hysterosalpingography (HSG): A prospective cohort study. Austin J Womens Heal 2014;1:4.
6. Hindocha A, Beere L, O'Flynn H, Watson A, Ahmad G. Pain relief in hysterosalpingography. Cochrane Database of Systematic Reviews 2015. Art. No.: CD006106.DOI: 10.1002/14651858.CD006106.pub3.
7. Unlu BS, Yilmazer M, Koken G, Arioz DT, Unlu E, Dogan Baki E, *et al*. Comparison of four different pain relief methods during hysterosalpingography: A randomized controlled study. Pain Res Manag 2015;20:107-11.
8. Frishman GN, Spencer PK, Weitzen S, Plosker S, Shafi F. The use of intrauterine lidocaine to minimize pain during hysterosalpingography: A randomized trial. Obstet Gynecol 2004;103:1261-6.
9. Costello MF, Horrowitz S, Steigrad S, Saif N, Bennett M, Ekangaki A. Transcervical intrauterine topical local anesthetic at hysterosalpingography: A prospective, randomized, double-blind, placebo-controlled trial. Fertil Steril 2002;78:1116-22.
10. Bachman EA, Senapati S, Sammel MD, Kalra SK. Randomized controlled trial of benzocaine versus placebo spray for pain relief at hysterosalpingogram. Reprod Biomed Online 2014;28:748-52.
11. Wang YL, Gao HX, Wang JS, Wang JH, Bo L, Zhang TT, *et al*. Immersive virtual reality as analgesia for women during hysterosalpingography: Study protocol for a randomized controlled trial. Trials 2020;21:102.
12. Hoffmann B. Well Woman Care. In Williams Gynecology. 3rd ed. New York: McGraw Hill; 2016. p. 4-5.
13. Rajashanker B. Reproductive system. In Chapman and Nakielny's Guide to Radiological Procedures. 6th ed. Edinburgh: Elsevier. 2016. p. 159-62.
14. Katz J, Melzack R. Measurement of pain. Surg Clin North Am 1999;79:231-52.
15. Yahya A, Adesiyun A, Giwa F, Olorukooba AA. Seroprevalence and clinical correlates of human immunodeficiency virus infection among women with infertility in northwestern Nigeria. Trop J Obstet Gynaecol 2018;35:177-83.
16. Liberty G, Gal M, Halevy-Shalem T, Michaelson-Cohen R, Galoyan N, Hyman J, *et al*. Lidocaine-prilocaine (EMLA) cream as analgesia for hysterosalpingography: A prospective, randomized, controlled, double blinded study. Hum Reprod 2007;22:1335-9.