

# X-Ray Hysterosalpingography: The Most Painful Part in the Nigerian woman

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## ABSTRACT

**Background:** Hysterosalpingography (HSG) despite the accompanying pain still remains relevant in gynaecological practice. For effective analgesia, it is important to identify the most painful step of this procedure. Numerical Rating Scale (NRS) and the Categorical Pain Scale (CPS) were used to identify the most painful step of HSG procedure and to find out if age, parity and the degree of infertility affect pain perception in this group of patients.

**Patients and Methodology:** Ninety Four women referred for HSG due to infertility were recruited into this study. Their background pain and perceived pain of each step of the procedure was graded using the NRS and the CPS. The data collected were statistically analysed.

**Results:** Participant's age ranged from 21 to 34 years with a mean of 33.3±4.8 years. Cervical traction with introduction of cannula and instillation of contrast was found to be the most painful step of the procedure both having a median score of 6 (range 0-10) based on the NRS and were rated to be moderate to worst possible pain based on the CPS. Almost 65% of the patients perceived the pain to be more than expected and nearly 100% would have preferred one form of analgesia or the other.

**Conclusion:** The most painful step of HSG was found to be the same for the Nigerian women as in other parts of the world. These women should be offered effective analgesia for pain during HSG procedure.

**Key words:** Hysterosalpingography, Pain Rating, Painful Step

## INTRODUCTION

Hysterosalpingography (HSG) is invaluable in the investigation of female reproductive tract, and has long been in use for over 80 years<sup>1</sup> almost as soon as X-ray was discovered. The major gynaecological indication for HSG is infertility, to assess the tubal patency and other uterine abnormalities<sup>2</sup>. The drawback of this procedure is the associated pain which is tolerated by most women therefore it is desirable to make the procedure less painful for them. Attempts have been made by various researchers to find ways of ameliorating the pain, but have not yielded encouraging results.<sup>3,4,5</sup> HSG can be divided into steps and each step has different pain intensity. It has been shown that expression of perceived pain differs from one individual to the other and is influenced by many mediating factors<sup>6</sup>. For any pain relief method to be effective the most painful step of the procedure should be targeted.

This study was designed to identify the most painful step(s) of HSG procedure as perceived by the Nigerian women, to find out their pain expectation during the procedure and to determine whether or not it will be necessary to offer "step-targeted" analgesia during the procedure.

## PATIENTS AND METHODS

A prospective questionnaire based study of Ninety four consecutive women referred to the Radiology Department from the Gynaecology Clinic of the University College Hospital Ibadan for HSG between March and November 2010 were recruited into this study. The patients were all booked for the procedure based on their last menstrual period using the 10 day rule. Before the administration of the questionnaire to the patients verbal consent was taken, in accordance with departmental protocol, all patients were properly counselled by the doctor who was to perform the procedure and written consent taken. The procedure which was divided into 7 different parts viz-a viz before the procedure, introduction of speculum, application of tenaculum, introduction of

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uterine sound, cervical traction introduction of cannula, instillation of contrast and thirty minutes after the procedure. These different parts were properly explained to the patients prior to commencement of the procedure. They were asked to note the intensity of the pain they felt at each of these stages. Patients were earlier educated about the interpretation of the Numeric rating scale(NRS)- a 10-level scale and the Categorical Pain scale(CPS)-a 6-level scale with interpretation in the local language(Yoruba). The two scales have been validated in Nigerians<sup>7</sup>.

Under aseptic conditions with the patients in lithotomy position, the vulva was cleaned with antiseptic agent after which the patients were covered with sterile drapes. The cervical os was identified, inspected for any discharge and areas of hyperaemia. A uterine sound was used to gauge the approximate depth of the uterus after which the anterior lip of the cervical os was held with a pair of tenaculum, appropriate size of Leech Wilkinson's cannula was then inserted, and depending on the capacity of the uterus about 10-30 mls of non-ionic contrast medium (iopamirol) was introduced through the canular, while exerting gentle pull on the tenaculum in order to straightened the uterus and simultaneously pushing the canular in order to seal the os and avoid excessive reflux. Representative spot films were taken using GE silhouette VR (2004) basic machine with Kv of between 70 and 80 and MAs of 25-32 depending on the patient's size.

After the procedure, the doctor then asked the patients to rate their perceived pain of the different steps during the procedure including 30minutes after, based on the Numerical rating scale (NRS) and Category Pain Scale (CPS) using a data collection form.

The data obtained from each questionnaire were entered and analyzed using SPSS version 15. Results are presented in frequencies, percentages, means, standard deviations and ranges. Two categorical variables were compared using the chi-square test. Normally distributed continuous variables were compared using Student's t-test for independent groups while the non-parametric equivalent test (Wilcoxon rank-sum) was used to analyse skewed data. Kappa statistic was performed to determine consistency among the two measurement of pain level. Statistical significance was declared at the 5% level using two tailed p-values.

## RESULTS

### Demographic Characteristics

There were Ninety four women recruited into the study with age ranging between twenty one and thirty four years with a mean of  $33.3 \pm 4.8$  years. About two thirds (64%) of the patients were between the ages of thirty to thirty nine years of age. Ninety ((95.7%) were married, and only 4 (4.3%) had HSG done in the past. Sixty-Five (69.1%) were referred on account of secondary infertility while 25 (26.6%) were due to primary infertility Table I. The percentage agreement between NRS and CPS for perceived pain of

the different parts of the procedure ranged between 100% and 84%, with the Kappa value ranging between 1 and 0.736. There was no correlation in the pain experienced by those referred on account of primary or secondary infertility ( $p=0.693$ ).

### Perceived pain of the different steps

Perceived pain based on the NRS, showed that cervical traction with introduction of canular and instillation of contrast both had a median score of 6 (range 0-10), followed by application of tenaculum with a score of 5 (range 1-5). Introduction of uterine sound, thirty minutes after the procedure, and introduction of speculum had median score of 4, 3, and 2 respectively (Table II).

The CPS in Table III showed that 6 (6.4%) patients had mild pain before the procedure, however this did not influence the level of pain perceived by these patients during the procedure. Cervical traction with introduction of cannula and instillation of contrast was perceived as severe pain by fifty (53.2%), and very severe pain by forty three (45.7%) and worst possible pain by nine (9.6%) patients. Thirty minutes after the procedure, the perceived pain was categorised as worst possible pain by one (1.1%) patient.

**Table I: Demographic characteristics of patients**

Characteristics	Frequency	Percentage
<b>Age group</b>		
<30	18	19.1
30-39	60	63.8
40+	16	17.0
<b>Marital Status</b>		
Single	4	4.3
Married	90	95.7
<b>Previous HSG</b>		
Yes	4	4.3
No	90	95.7
<b>Parity (births)</b>		
None(0)	43	45.7
1-2	27	28.7
Not indicated	24	25.5
<b>Indication</b>		
Primary infertility	25	26.6
Secondary infertility	65	69.1
Others	4	4.2
<b>Total</b>	<b>94</b>	<b>100.0</b>

**Table II: Level of Perceived Pain of the different steps based on Numerical Rating Scale**

Stage of the Procedure	Median Pain (Range) N=94
Before the procedure	1(0-4)
Introduction of speculum	2(0-7)
Application of tenaculum	5(1-10)
Introduction of uterine sound	4(1-10)
Cervical traction introduction of cannula	6(0-10)
Instillation of contrast	6(1-10)
Thirty minutes after the procedure	3(0-10)

**Acceptability of repeat of the procedure if necessary**

Sixty-six (70.2%) patients would not mind to coming back for a repeat if necessary despite the pain, while 28 (29.8%) patients would not want a repeat because of pain, based on the NRS. There was no correlation between those who don't want a repeat because of pain and the parts considered to be the most painful during the procedure i.e introduction of cannular (p=0.039), Cervical traction introduction of cannula (p= 0.014) and instillation of contrast (p=0.041) (Table IV).

**Expected intensity of pain perceived**

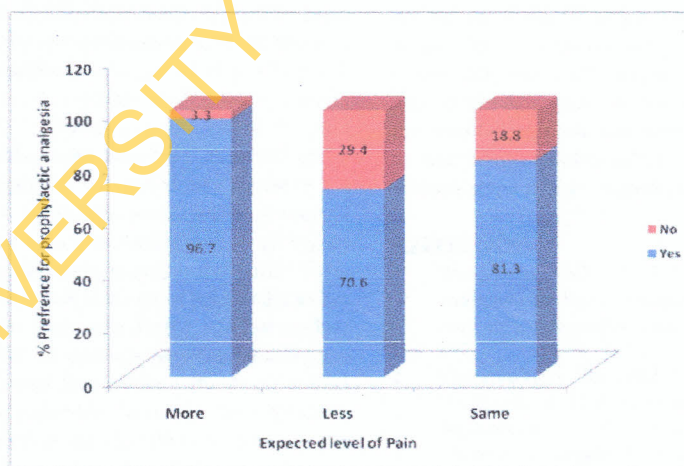
The intensity of the pain perceived was said to be more than expected by sixty-one (64.9%) patients, while seventeen patients (18.3%) and sixteen patients (17.0%) perceived the intensity of pain to be the same and less respectively. 96.7% of those who perceived the pain to be more, 70.6 % of those who perceived the pain to be less and 81.3% of those who perceived the pain to be the same as expected would have preferred a form of analgesia before the procedure (Figure 1).

**Table III: Level of Perceived Pain of the different steps based on Category Pain Scale**

	Categorization of Pain						Total =100%
	No pain	Mild pain	Moderate pain	Severe pain	Very Severe Pain	Worst Possible	
Before the procedure	88(93.6)	6(6.4)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	94
Introduction of speculum	35(37.2)	43(45.7)	14(14.9)	1(1.1)	1(1.1)	0(0.0)	94
Application of tenaculum	2(2.1)	18(19.1)	42(44.7)	18(19.1)	13(13.8)	1(1.1)	94
Introduction of uterine sound	13(13.8)	32(34.0)	32(34.0)	13(13.8)	4(4.3)	0(0.0)	94
Cervical traction introduction of cannula	4(4.3)	11(11.7)	33(35.1)	26(27.7)	18(19.1)	2(2.1)	94
Instillation of contrast	4(4.3)	15(16.0)	17(18.1)	24(25.5)	25(26.6)	9(9.6)	94
Thirty minutes after:	29(30.9)	44(46.8)	14(14.9)	5(5.3)	1(1.1)	1(1.1)	94

**Table IV: Comparison of pain experienced at the different steps of the procedure by patients who do not mind a repeat of the procedure and those who would mind a repeat if the need arises based on the Numerical Rating Scale (NRS)**

	Don't mind a Repeat despite pain Median(Range)	Can't because of Pain Median(Range)	P-value
Before the procedure	1(3)	1(4)	0.687
Introduction of speculum	2(6)	2.5(7)	0.256
Application of tenaculum	5(7)	6(8)	0.100
Introduction of uterine sound	4(9)	4.5(7)	0.039*
Cervical traction introduction of cannula	5(8)	6(10)	0.014*
Instillation of contrast	6(9)	7(8)	0.041*
Thirty minutes after the procedure	3(10)	3(7)	0.038*



**Figure 1: Expected and the actual perceived intensity of Pain and preference for prophylactic analgesia before the procedure**

## DISCUSSION

HSG is one of the earliest developed radiological procedures which still remains relevant in investigating infertility till today<sup>8</sup>, however the procedure is painful. A lot of effort has been directed to finding complete pain relief for patients during this procedure but not much success has been recorded<sup>1,3,9</sup>. Infertility in women in the African setting carries a lot of stigmatisation especially in the primary infertility state. Therefore women who are infertile will do everything to remove this stigma<sup>10</sup>.

Perception of pain is relative from one individual to the other and it is therefore difficult to evaluate. In this study, we employed the combination of the numeric rating scale and the categorical pain scale, which is an extended form of the verbal rating scale. These two scales have been found to be valid and reliable for the assessment of pain in clinical setting<sup>11</sup>. Soyannwo et al<sup>7</sup> in a study on pain assessment in Nigerians, compared the visual analogue scale and the verbal rating scale in two languages-Yoruba and English. They concluded that there is a significant positive relationship between the visual analogue scale and the verbal rating scale categorical pain scale and that both are useful tools for pain assessment in Nigerians<sup>7</sup>.

The pain experienced during HSG is usually accepted as necessary, however acceptability of analgesia has been shown to have correlation with higher educational attainment<sup>12</sup>; it has also been known that the expression of perceived pain differ from one ethnic group to the other. This study was done in Ibadan which is a city with predominantly Yoruba ethnic group, and 98% of those recruited for this study were Yorubas, which have been shown to have lower pain tolerance than the other major ethnic groups in Nigeria<sup>13</sup> but in the study done in the United Kingdom by Elson, no difference was found amongst the different ethnic groups<sup>1</sup>.

HSG has many integral steps with different intensity of pain perception level, this study has identified the most painful steps to be at the cervical traction with introduction of cannula and the instillation of contrast steps (Tables II and III), this finding corroborate the study done by Liberty and Robinson *et al*<sup>14,15</sup>. Many patients found the pain they experienced to be more than they expected and a third of the patient sampled will not want a repeat of the procedure (Figure 1). Those who would not want a repeat procedure were those who statistically perceived higher pain intensity at the identified most painful parts (Table IV). This refusal for a repeat because of pain underscores the need to effectively treat pain during HSG procedure because avoiding HSG by patients may hinder adequate work on infertility. Other factors like patients emotional state, duration of the procedure have also been found to have a bearing on pain tolerance in HSG procedure. Other variables that have been found to affect pain tolerance during HSG include degree of trauma to the cervix, primary infertility, emotional state, self motivation, type of contrast amongst others<sup>6</sup>. It can also be speculated that many of

the patients are primed prior to the procedure from shared stories told them by those who have had HSG experience in the past.

Many study trials have been conducted to strategise on how to minimise pain during HSG. Bello et al concluded that patients premedicated with tramadol did not statistical decrease in pain perception in the African women<sup>4</sup>, neither was paracetamol in a study done by Elson and Ridley in the United Kingdom<sup>1</sup>. In a randomised double blind controlled study, Liberty et al found out that topical application of Lidocaine-prilocain (EMLA) 5% cream to the cervix before performing HSG significantly reduced pain associated with cervical instrumentation but not the peritoneal contrast spillage step which is equally painful, while Cengiz et al found that 0.25 µg.kg<sup>-1</sup> continuous intravenous infusion of remifentanyl reduced pain with minimal side effects<sup>14,16</sup>.

However separate studies conducted by Frishman in the United States and Gupta in India found that intrauterine instillation of lidocaine or oral naproxene respectively did not appear to be effective in decreasing pain in women undergoing HSG<sup>5,9</sup>, and intracervical block did not decrease pain perception during the most painful component of HSG<sup>15</sup>. In a Cochrane database system review, Ahmad et al summarised in their conclusion that there is little evidence of benefit in terms of pain relief of any of the interventions<sup>3</sup>. These findings however do not preclude efforts to find acceptable pain relief for women undergoing HSG in our environment as almost all the patients in this study would have preferred prophylactic analgesia irrespective of the expected intensity of pain perceived (Figure 2).

## CONCLUSION

This study have identified that Nigerian women found all steps of HSG to be painful, but cervical traction with introduction of cannula and the instillation of contrast are the most painful steps. There is need to adequately prepare the patients for this procedure through adequate counselling and emotional preparedness and to offer them step-targeted analgesia. As long as HSG remains an important investigative procedure for infertility, the quest to search for complete relief of the pain considering the various steps in this procedure continues.

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