



## Relevance of hysterosalpingogram (HSG) in infertility assessment at the rivers state university teaching hospital, Port Harcourt

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### Abstract

**Background:** The aim of this study was to determine the relevance of Hysterosalpingogram (HSG) in current infertility management and to highlight the shortcomings of Hysterosalpingography at the Rivers State University Teaching Hospital (RSUTH), Nigeria and sub-Saharan Africa.

**Methods:** This was a retrospective, cross-sectional study of 200 Hysterosalpingogram results of patients that were being managed for infertility from 1<sup>st</sup> January 2020 to 31<sup>st</sup> December 2021 at the Rivers State University Teaching Hospital, Port Harcourt. The HSG was done at the Radiological Department of the hospital. Data were collected from the patient case notes and from the Radiological department of RSUTH and analysed using SPSS version 25. Quantitative data were presented as mean  $\pm$  SD while qualitative ones were described as frequency and percentages.

**Results:** A total of 200 Hysterosalpingogram results of patients were analysed. Their mean  $\pm$ SD age was 33.5 $\pm$ 5 years. The indication for HSG was infertility for all of them. Infertility duration was greater than one year for all of them. Sixty-two (31%) had primary infertility while 138 (69%) had secondary infertility. One hundred and three (51.5%) of the patients had significant previous gynaecological and obstetric history that predisposed them to tubal factor infertility. HSG findings were bilateral tubal patency in 79 cases (39.5%), Hydrosalpinx/peritubal adhesions in 11(5.5%), unilateral tubal occlusion in 14 (7%), bilateral tubal occlusion in 35(17.5%), and intra uterine adhesion in 50 (25%). Thus, HSG investigation was able to detect the likely cause of infertility in (60.5%) of the participants.

**Conclusion:** HSG is still the most common first-line diagnostic test to evaluate the uterine cavity and tubal pathology in infertility patients. Laparoscopy, hysteroscopy, transvaginal ultrasound scan, and magnetic resonance imaging are more reliable methods of detecting tubal pathology or uterine cavity anomalies in infertility evaluation. These are not easily available in low -and -middle-income countries, especially sub-Saharan Africa and Nigeria in particular because of cost. HSG is relatively cheap and uncomplicated, which has contributed to it acquiring a primary role in assessing abnormal findings in fallopian tubes and uterine cavity.

**Keywords:** RSUTH, Hysterosalpingogram, infertility, fallopian tubes

### Introduction

Infertility is a major public health concern and a gynaecological problem worldwide. This is more in Africa since childlessness is seen as a personal tragedy. It is associated with significant morbidity for both partners. It can result in stress, depression, mental instability, emotional distress, and suicidal tendencies [1-3]. Investigation and treatment of infertility are also associated with psychological and physical trauma, worsened by the length of treatment and the multidisciplinary approach that is involved [1].

Infertility is the ability of a couple to achieve pregnancy after 1 year of regular, unprotected sexual intercourse [4, 5]. Causes of infertility are multifactorial and include problems related to follicle growth, structural abnormalities, fallopian tube occlusion secondary to pelvic infection, uterine abnormalities, ovulation disorders, hormonal in-balance, male factor, or a combination of various factors in a woman [2].

Hysterosalpingogram (HSG) is an imaging modality that utilizes contrast media and radiographic techniques to visualize the uterine cavity and the lumen of the fallopian tubes [3, 6]. HSG plays a crucial role in determining the cause of infertility, evaluating morphology and patency of fallopian tubes, unilateral or bilateral tubal blockage, congenital anomalies of the uterus, irregular shape of the endometrium due to fibroids, intrauterine adhesions or endometrial hyperplasia [2, 7, 8]. This imaging procedure thus plays an important role in the diagnostic evaluation of female infertility.

There are other imaging modalities used for the work-up of infertility. Magnetic Resonance Imaging (MRI) is non-invasive, does not utilize ionizing radiation, and requires less user subjectivity [1, 9, 10]. Hysteroscopy and laparoscopy are other useful methods for working-up infertility but are more invasive and expensive procedures. Many abnormalities detected on HSG may still need confirmation with laparoscopy, hysteroscopy, or pelvic ultrasound [1, 11, 12]. Laparoscopy and Dye tests have proved superior to HSG in differentiating cornual spasm from cornual occlusion [13, 14].

This study aims to highlight the relevance of Hysterosalpingogram as a vital investigative procedure for the work-up of patients with infertility despite its shortcomings.

### Materials and Methods

This was a retrospective cross-sectional study of HSG results of 200 patients, done at the Radiology department of Rivers State University Teaching Hospital (RSUTH) from 1st January 2020 to 31st December 2021. The working diagnosis for all the 200 cases was infertility.

The RSUTH is situated in Port Harcourt, Rivers State Nigeria. It receives referrals from both public and Private hospitals within Port Harcourt and its environment. Port Harcourt is the Capital of Rivers state which is the sixth most populous state in Nigeria, with a population of 7,303,924 according to the 2016 National Bureau of statistics projected population.

HSG was actually done on the 10<sup>th</sup> day from the 1<sup>st</sup> day of the last menstrual period. This was to ensure that patients were not pregnant at the time of the test.

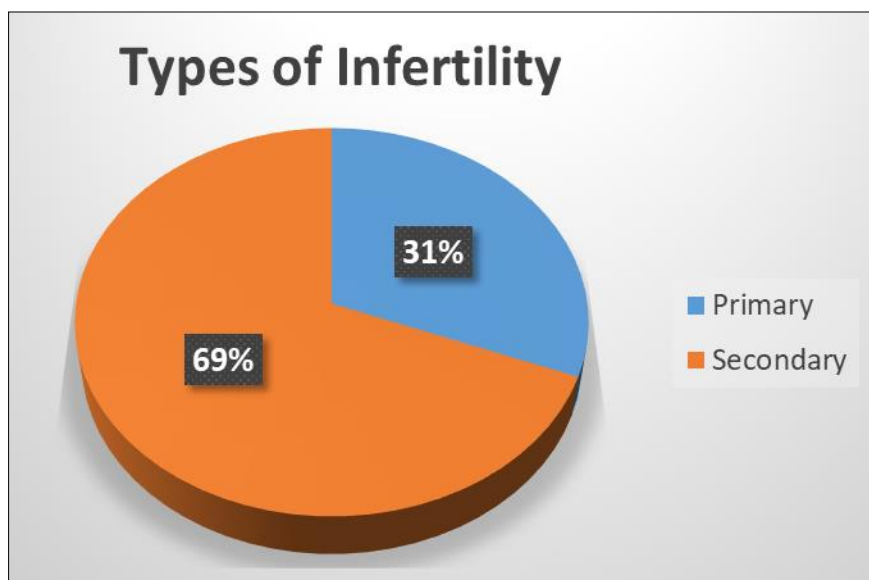
HSG results were retrieved from patients' case notes, including socio-demographic characteristics. Other information extracted from the case notes includes indications for HSG, age, mass index (BMI), infertility duration, parity, history of miscarriage, previous surgical intervention, pelvic inflammatory disease, history of assisted reproduction, and live births. Data were entered and analysed using SPSS version 25.0 Armonk, NY.

Quantitative data were presented as mean  $\pm$ SD while qualitative ones were described as frequency and percentages.

### Results

HSG results of 200 patients were analysed. Ages ranged from 21-50 years with a mean age of 33.5 $\pm$ 5 years. The majority 138(69%) of the participants had secondary infertility while 62(31%) had primary infertility (Figure1). Table 1 shows the sociodemographic characteristics of the study participants. The majority of the participants were married 193 (96.5%), Christians 158(79%), and employed 84 (42%) respectively. One hundred and three (51.5%) of the patients had previous gynaecological or obstetric procedures/interventions (Table 2). Of this, fifty-four had previous myomectomy, 24 previous caesarean section, 7 had postpartum evacuation of the uterus for retained products of Conception. 5 patients had sepsis. Ten had salpingectomy for ruptured ectopic gestation and 3 patients had previous intrauterine foetal death (IUFD) (Table 2).

The HSG Findings are presented in Table 3. Majority 79 (39.5%) had bilateral tubal patency.



**Fig 1:** Types of infertility

**Table 1:** Sociodemographic characteristics of Study participants N=200.

Age Category (Years)	Presence of Infertility Number (%)
21-45	8(4)
26-30	71(31.5)
31-35	86(43)

36-40	17(8.5)
41-45	11(5.5)
46-50	7(3.5)
Marital Status	
Single	7(3.5)
Married	193(96.5)
Religion	
Christian	158(79)
Moslem	39(19.5)
Atheist	3(1.5)
Employment Status	
Employed	84(42)
Unemployed	67(33.5)
Self employed	49(24.5)

**Table 2:** Significant Previous History of the Participants N=103

Significant Previous History	Number (%)
Previous Myomectomy	54 (52.4)
Previous caesarean section	24 (23.3)
Evacuation of retained products of conception	7 (6.8)
Post-partum sepsis	5 (4.8)
Post salpingectomy for ruptured ectopic pregnancy	10 (9.7)
Previous intrauterine foetal death (IUFD)	3 (2.9)

**Table 3:** HSG findings among participants N=200

Findings	Number (%)
Bilateral Tubal Patency	79(39.5)
Cornual Tubal Occlusion	11(5.5)
Hydrosalpinx/Peritubal adhesions	11(5.5)
Unilateral Tubal Occlusion	15(7.5)
Bilateral Tubal Occlusion	35(17.5)
Intra Uterine Adhesions	50(25)

## Discussion

The indication for Hysterosalpingogram (HSG) in all the 200 cases in this study was infertility. HSG could also be used to locate a missing intra uterine contraceptive device. It could be used to detect polyps, endometrial hyperplasia, sub mucous fibroid, intra uterine adhesions, and septa. These findings necessitate further evaluation with hysteroscopy to confirm and possibly treat the pathology.

The prevalence of infertility is reported to be between 5-15% in developed countries. In tropical Africa between 10-20%, although rates of up to 30% have been recorded in Congo [3].

A major cause of infertility in sub-Saharan Africa is pelvic inflammatory disease (PID) usually due to *Neisseria gonorrhoeae* [3, 15]. From this study, 69% of the cases were secondary infertility. There have been reports suggesting that tubal pathologies may be responsible for most cases of secondary infertility [15].

Tubal factor infertility has disparate prevalence geographically, accounting for over 85% of women's infertility in sub-Saharan Africa, compared with 35% worldwide [16]. This is due to the high incidence of puerperal sepsis, post abortal sepsis, and pelvic inflammatory disease (PID). It has been estimated that PID-related tubal adhesion causes 30-50% of all cases of infertility [3, 15].

Infertility was highest in the age group 31-35yrs, in this study. This is similar to other studies on infertility [13]. This may be due to greater fertility concerns around this age, as most women would have completed their education by this age, got married, and started desiring conception.

96.5% of women who had their HSG examined were married.

Most people in South-South Nigeria are Christians, so it was not surprising that 79% of the cases were Christians. Eighty -Four (42%) of the women were employed and 24, 5% were self-employed.

More than 50% (103) of those studied had past obstetrics or gynaecological history that predisposed them to infertility, especially secondary infertility. 52.4% had a previous Myomectomy. Perifimbrial adhesions and intrauterine adhesions could lead to infertility. 23.3% had a history of caesarean section. Endometritis following caesarean section could lead to intra uterine adhesion and Asherman's syndrome. This is a cause of secondary infertility. Higher rates of tubal pathology in secondary infertility could be used as a crude indicator of the possible effects of the post abortal and postpartum infections. The infection leads to tubal damage and tubal pathology that predisposes women to secondary infertility.

HSG plays a crucial role to determine the cause of infertility, especially to evaluate the morphology and patency of the fallopian tubes in women, and also has a therapeutic effect<sup>[17]</sup>. It could be used to flush the fallopian tubes, regardless of the contrast medium used<sup>[8,9]</sup>.

Sub fertile women with a 17% chance of ongoing pregnancy with no intervention could increase their chance of pregnancy to 29% after a tubal flush, with oil-based contrast media<sup>[9, 18, 19]</sup>.

However, HSG is painful and may cause an intense cramping sensation because of contrast injections. Thus, the procedure requires some analgesia. Also, pre-procedure education and counselling of patients will help to reduce stress and anxiety associated with the procedure.

### Conclusion

HSG is still the most common first line diagnostic test to evaluate the uterine cavity and tubal patency. Several centres include HSG as a standard part of the infertility work-up for all consenting women. It is relatively cheap, compared to other imaging procedures for infertility investigation.

Although laparoscopy and dye tests have proved superior to HSG in differentiating cornual spasm from cornual occlusion and hysteroscopy is a better detector of intra uterine pathologies like adhesions, polyps, and septa, these facilities are not easily available in developing countries. Even when available, maintenance culture is poor, so they break down and are not easily repaired or replaced. Additionally, selective ostial salpingography can be used to differentiate a true mechanical obstruction from a spasm without subjecting the patient to laparoscopy. However, hysterosalpingogram still remains relevant as an investigative procedure for determining the cause of infertility. It is inexpensive and uncomplicated, which has contributed to it acquiring a primary role in assessing abnormal findings in fallopian tubes and uterine cavity.

### Conflict of Interest

The authors declare that there is no conflict of interest

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