

Original Article

Evaluation of Pattern of Hysterosalpingography in Infertility Patients

<https://doi.org/10.70357/jdamc.2024.v0802.02>

Afroz M¹, Choudhury SF², Yeasmin L³, Bilkis US⁴, Ahmed MM⁵, Nurunnabi M*⁶

Abstract

Background: Hysterosalpingography (HSG) is an X-ray procedure frequently used to examine the female reproductive tract, including the uterus and fallopian tubes, primarily for evaluating infertility. **Objectives:** To assess the pattern of hysterosalpingography of women with infertility. **Methods:** An observational cross-sectional study was conducted on 119 infertile patients who underwent hysterosalpingography with ionic water-soluble contrast media at Popular Medical Centre Limited, Sylhet. Clinical records and radiological findings were analyzed to assess demographic data, uterine condition, and tubal and pelvic pathology. **Results:** The mean age of the patients was 34.4±4.1 years, and the average duration of marriage was 7.6±3.2 years. Among the patients, 38.7% were diagnosed with primary infertility, while 61.3% had secondary infertility. The mean duration of infertility was 4.1±1.8 years. Abnormal HSG results were found in 64.7% of the patients. Of those with abnormal results, more than half (53.2%) had tubal abnormalities, 28.6% had uterine abnormalities, and 18.1% had both types of findings. Regarding tubal abnormalities, 17.1% had a right tubal blockage, 22.0% had a left tubal blockage, 24.4% had bilateral tubal blockages, and 36.6% had both tubes patent. In terms of uterine abnormalities, an arcuate uterus was found in 45.5% of cases, a unicornuate uterus in 31.8%, a bicornuate uterus in 13.6%, and Asherman syndrome in 9.1% of the women. **Conclusion:** It has been identified that a significant reason to infertility is tubal conditions. With its low risk and few risks, this study has demonstrated that hysterosalpingography ought to be the initial method used to diagnose infertility.

Keywords: Hysterosalpingography, infertility, married women, Bangladesh.

Introduction

Infertility is a complex condition with substantial medical, psychological, and economic impacts. It is defined as the inability of a couple to conceive after 12 months of regular, unprotected sexual intercourse^{1,2}. It poses a significant burden for couples in developing nations and accounts for a large portion of gynecological outpatient consultations³. The infertility rate varies between 5% and 30%, as reported in different countries⁴. It is estimated that 15% of all women will experience primary or secondary infertility at some point during their reproductive years⁵. Infertility in women can result from disorders affecting the fallopian tubes, uterus, cervix, or ovaries.

However, abnormalities in the fallopian tubes are responsible for infertility in approximately 35-40% of cases^{6,7}.

Hysterosalpingography (HSG) is the most commonly used and widely accessible radiological test for evaluating infertility in women^{8,9}. It has long been an essential procedure for evaluating tubal patency, as well as diagnosing tubal and intrauterine pathologies¹⁰. It is a diagnostic imaging technique for evaluating infertility should be non-invasive, cost-effective, quick, easy to perform, and capable of providing information on tubal patency and pelvic conditions^{8,11}.

Author's Affiliation:

1. Murshida Afroz, Assistant Professor, Department of Obstetrics & Gynecology, Sylhet Women's Medical College Hospital, Sylhet 3100, Bangladesh.
2. Shahana Ferdous Choudhury, Professor and Head, Department of Obstetrics & Gynecology, Sylhet Women's Medical College Hospital, Sylhet 3100, Bangladesh.
3. Lubna Yeasmin, Associate Professor, Department of Obstetrics & Gynecology, Sylhet Women's Medical College Hospital, Sylhet 3100, Bangladesh.
4. Umme Sayeeda Bilkis, Assistant Professor, Department of Obstetrics & Gynecology, North East Medical College Hospital, Sylhet 3100, Bangladesh.
5. Mohammad Monjur Ahmed, Consultant, Kajolhaor Diabetic Center, Sylhet 3100, Bangladesh.
6. *Mohammad Nurunnabi, Assistant Professor, Department of Community Medicine and Public Health, Sylhet Women's Medical College, Sylhet 3100, Bangladesh..

Address of Correspondence : *Dr. Mohammad Nurunnabi, Assistant Professor, Department of Community Medicine and Public Health, Sylhet Women's Medical College, Sylhet 3100, Bangladesh. nur.somch@gmail.com, <https://orcid.org/0000-0001-9472-9369>

It has a sensitivity of 65% and a specificity of 83% for detecting tubal blockage¹². Furthermore, HSG may be used as a treatment for improving subfertility¹³.

Hysterosalpingography (HSG) can be performed in an outpatient setting with minimal analgesia, typically involving premedication with a non-steroidal anti-inflammatory drug (NSAID). The procedure is usually scheduled between menstrual bleeding and ovulation. Either water- or oil-based contrast dyes can be used, with some evidence suggesting that oil-based dyes may enhance fertility, at least for the first few cycles^{14,15}. HSG is contraindicated in cases of adnexal mass, pelvic inflammatory disease, a history of ectopic pregnancy, or allergies to iodine or radiocontrast dye. Uterine abnormalities detectable by HSG include congenital anomalies, intrauterine polyps, submucous leiomyomas, surgical changes, and synechiae. Proximal or distal tubal blockage, salpingitis isthmica nodosum, polyps, hydrosalpinx, and peritubal adhesions are examples of tubal abnormalities that can be detected¹⁶. Despite the advent of newer imaging techniques, HSG remains the most widely used tool for studying infertility, owing to its ability to effectively assess tubal occlusion.

Methods

This observational cross-sectional observational study included 119 patients who underwent HSG at Popular Diagnostic Centre, Sylhet, from February to July 2024. The patients were referred for this procedure by various infertility specialists, as well as government and private hospitals. The study aims to evaluate the patterns of hysterosalpingography in infertile women.

Purposively selected data were collected from 119 patients who were at least 18 years old. All consecutive patients who underwent hysterosalpingography (HSG) for infertility during the study period were included. Patients whose medical records, request forms, or radiographs could not be traced were excluded. Clinical records and radiological findings were analyzed to evaluate demographic information, uterine condition, as well as tubal and pelvic pathologies.

The data were checked and cleaned followed by making a template, categorizing data, coding and recoding into IBM SPSS v25. The analysis was carried out by using descriptive and inferential statistics, presented with frequency tables and charts.

Before starting the interviews, the researcher obtained informed consent and permission to record from the participants. The confidentiality of the participants was maintained throughout the study. Ethical approval was granted by the Institutional Research Board (IRB) of Sylhet Women’s Medical College, Sylhet 3100, Bangladesh.

Results

Table 1 summarizes the baseline characteristics of the patients. The largest proportion of women (40.3%) was aged 26-32, followed by 30.3% in the 33-39 age range, and 22.7% aged 40 or older. The mean age was 34.4±4.1 years. The average duration of marriage was 7.6±3.2 years, with 43.7% of marriages lasting 5-10 years. Nearly one-third of the women (31.1%) reported a history of pelvic inflammatory disease (PID). Among the patients, 38.7% were diagnosed with primary infertility, while 61.3% had secondary infertility. The mean duration of infertility was 4.1±1.8 years, with nearly two-thirds (63.8%) experiencing infertility for 3-4 years.

Table 2 exhibitions the patterns of HSG findings among the patients. Nearly two-thirds (64.7%) had abnormal HSG results, while one-third (35.3%) showed normal findings. Among those with abnormal results, more than half (53.2%) had tubal abnormalities, 28.6% had uterine abnormalities, and 18.1% exhibited both types of findings.

Figure I illustrate the tubal abnormalities identified in the patients. A right tubal blockage was found in 17.1% of women, a left tubal blockage in 22.0%, a bilateral tubal blockage in 24.4%, and both tubes were patent in 36.6% of the women.

Figure II shows the uterine findings on HSG among the women. An arcuate uterus was found in 45.5% of cases, a unicornuate uterus in 31.8%, a bicornuate uterus in 13.6%, and Asherman syndrome in 9.1% of the women.

Table 1: Baseline characteristics of the study participants (n=119)

	Attributes	Frequency (n)	Percent (%)
Age groups (in years)	18-25	8	6.7
	26-32	48	40.3
	33-39	36	30.3
	≥40	27	22.7
	Mean±SD		34.4±4.1
Duration of marriage (in years)	<5	41	34.5
	5-10	52	43.7
	>10	26	21.8
	Mean±SD		7.6±3.2
Clinical features of PID	Present	37	31.1
	Absent	82	68.1
Types of infertility	Primary infertility	46	38.7
	Secondary infertility	73	61.3
Duration of infertility (in years)	≤2	21	17.6
	3-4	76	63.8
	≥5	22	18.5
	Mean±SD		4.1±1.8

Table 2: Patterns of HSG findings of the patients (n=119)

Attributes		Frequency (n)	Percent (%)
HSG findings	Normal findings	42	35.3
	Abnormal findings	77	64.7
Abnormal findings (n=77)	Tubal findings	41	53.2
	Uterine findings	22	28.6
	Both uterine and tubal findings	14	18.1

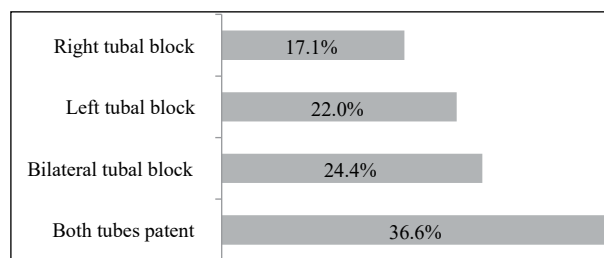


Figure I: Tubal findings at HSG (n=41)

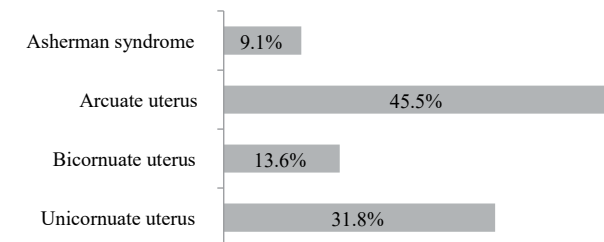


Figure II: Uterine findings at HSG (n=22)

Discussion

The largest group of women (40.3%) was aged 26-32, followed by 30.3% aged 33-39, and 22.7% aged 40 or older. The average age was 34.4±4.1 years. The mean duration of marriage were 7.6±3.2 years, with 43.7% of marriages enduring 5-10 years. Nearly one-third (31.1%) of the women reported a history of PID. Of the patients, 38.7% were diagnosed with primary infertility and 61.3% with secondary infertility. The average duration of infertility was 4.1±1.8 years, with almost two-thirds (63.8%) experiencing infertility for 3-4 years. Among the 44 patients, 59.0% had primary infertility, while 41.0% had secondary infertility. Nearly 82% of the patients experienced infertility lasting between 1 and 5 years¹⁴. In a study conducted in Bangladesh¹⁷, the majority of women (55% for primary infertility and 60% for secondary infertility) were in the 26-30 age groups. Additionally, most cases (46%) sought treatment at the infertility center after 2-5 years of unsuccessful attempts to conceive. In another study conducted in Nigeria¹⁸, a total of 134 women were recruited over the course of one year. The participants' ages ranged from 23 to 50

years, with a mean age of 34.9±5.53 years. In a study conducted in India³, tubal factors were the leading cause of female infertility, accounting for 54.54% of cases. These included various pathologies such as pelvic inflammatory disease (PID) and genital tuberculosis. PID was found to be more prevalent in cases of primary infertility.

The patterns of HSG findings among the patients showed that nearly two-thirds (64.7%) had abnormal results, while one-third (35.3%) had normal findings. Of those with abnormal results, over half (53.2%) had tubal abnormalities, 28.6% had uterine abnormalities, and 18.1% had both types of abnormalities. In India³, abnormal HSG findings were observed in 37.7% of cases. In another study, HSG abnormalities were observed in 86% of the women¹⁹. In another study conducted in Nepal¹⁴, out of the total 44 patients, 15 (34.1%) had both bilateral normal tubes and a normal uterus and tubal abnormalities were observed in 63.6% of the patients.

In this study, the tubal abnormalities identified among patients included a right tubal blockage in 17.1% of women, a left tubal blockage in 22.0%, and a bilateral tubal blockage in 24.4%, while 36.6% of the women had both tubes patent. The uterine findings on HSG among the women included an arcuate uterus in 45.5% of cases, a unicornuate uterus in 31.8%, a bicornuate uterus in 13.6%, and Asherman syndrome in 9.1% of the women. Among the women in the study, unilateral blockage was reported in 36%, while bilateral blockage was observed in 64%¹⁹. In underdeveloped nations, where high rates of pelvic inflammatory illness and a lack of resources contribute to the prevalence, 15–30% of infertility occurrences among women are caused by tubal causes²⁰. In Iran²¹, among the 35 women with abnormal findings, 25 had unilateral tubal occlusion, while only 2 had bilateral occlusion. Additionally, 6 women had previously undergone unilateral tubal resection due to ectopic pregnancy. Notably, only two cases of uterine abnormalities were identified: one with a unicornuate uterus and the other with a septate uterus.

Conclusion

The study revealed that tubal pathology is a foremost contributor to infertility. Infertility is commonly recognized as a prevalent medical condition. There are numerous techniques for detecting the causes of infertility that are commonly available nowadays. Hysterosalpingography may still be crucial in identifying the uterine and tubal reasons of infertility in developing countries like ours.

Acknowledgments: The authors thank the women who participated in this study.

Competing interests: No competing financial interests.

Source of funding: No fund received.

References

1. Brugo-Olmedo S, Chillik C, Kopelman S. Definition and causes of infertility. *Reproductive biomedicine online*. 2001;2(1):173-85.
2. Pundir J, Toukhy TE. Uterine cavity assessment prior to IVF. *Women's health*. 2010;6(6):841-8.
3. Gupta M, Agarwal N, Agrawal A. Evaluation of Pattern of Hysterosalpingography in Infertility Patients. *Journal of Pharmaceutical Negative Results*. 2022;963-9.
4. Deshpande PS, Gupta AS. Causes and prevalence of factors causing infertility in a public health facility. *Journal of human reproductive sciences*. 2019;12(4):287-93.
5. Roupa Z, Polikandrioti M, Sotiropoulou P, Faros E, Koulouri A, Wozniak G, Gourni M. Causes of Infertility in Women at Reproductive Age. *Health science journal*. 2009;3(2):80-87.
6. ReisMM, SoaresSR, CancadoML, CamargosAF. Hysterosalpingo contrast sonography (HyCoSy) with SH U 454 (Echovist) for the assessment of tubal patency. *Human Reproduction (Oxford, England)*. 1998;13(11):3049-52.
7. Rakhimova M. Infertility in women classification, symptoms, causes and factors, recommendations for women. *Science and innovation*. 2022;1(D7):245-50.
8. Capobianco G, Crivelli P, Piredda N, Maiore M, Cherchi PL, Dessole M, Viridis G, Dessole S, Meloni GB. Hysterosalpingography in infertility investigation protocol: is it still useful. *Clinical and Experimental Obstetrics & Gynecology*. 2015;42(4):448-51.
9. Kiguli-Malwadde E, Byanyima RK. Structural findings at hysterosalpingography in patients with infertility at two private clinics in Kampala, Uganda. *African health sciences*. 2004;4(3):178-81.
10. Haque S. Role of hysterosalpingography for evaluation of infertility. *Bangladesh Medical Journal*. 2010;39(1):16-23.
11. Ranjan P, Ranjan R. Hysterosalpingography: A re-emerging study with current application. *Journal of Evolution of Medical and Dental Sciences*. 2015 Dec 10;4(99):16457-64.
12. Khalaf Y. ABC of subfertility tubal subfertility. *BMJ* 2003; 327:610-3.
13. Lim CP, Hasafa Z, Bhattacharya S, Maheshwari A. Should a hysterosalpingogram be a first-line investigation to diagnose female tubal subfertility in the modern subfertility workup? *Human reproduction*. 2011;26(5):967-71.
14. Santhalia PK, Gupta MK, Uprety D, Ahmad K, Ansari S, Agrawal N, Rauniyar RK. Role of Radiographic Hysterosalpingography in Infertility in Eastern Nepal. *Nepalese Journal of Radiology*. 2013;3(1):59-66.
15. Kumar P, Malhotra N. Infertility and Assisted Reproductive Technology. Jeffcoate, s *Principle of Gynecology*. 7th Edition. New Delhi: Jaypee Brothers Medical Publishers Ltd. 2008;7:699-700.
16. Kumar A, Ghadir S, Eskandari N, DeCherney AH. Infertility. In: DeCherney AH, Nathan L, Goodwin TM, Laufer N, editors. *Current Diagnosis & Treatment Obstetrics & Gynecology*. 10th edition. New York: McGraw-Hill; 2007:917-22.
17. Khan MI, Jesmin S, Jerin J, Shermin S, Chowdhury TA. Hysterosalpingography in Infertility. *Delta Medical College Journal*. 2014;2(1):9-12.
18. Aduayi OS, Akanbi GO, Akintayo AA, Aduayi VA. Hysterosalpingography findings among women presenting for gynecological imaging in Ado-Ekiti, South western Nigeria. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2016;5(6):1906-11.
19. Antonisamy N, Reddy NS, Chinta P, Waanbah BD, Samadhiya R, Aleyamma TK, Antonisamy B, Kamath MS. Role of Hysterosalpingography in Diagnosing Tubal Blockage—A Prospective Diagnostic Study. *Journal of Human Reproductive Sciences*. 2021;14(4):386-91.
20. Danfulani M, Mohammed MS, Ahmed SS, Haruna YG. Hysterosalpingographic findings in women with infertility in Sokoto North Western Nigeria. *African Journal of Medical and Health Sciences*. 2014;13(1):19.
21. Morshed Behbahani B, Doryanizadeh L, Parsanezhad ME, Dabbaghmanesh MH, Jokar A, Ghaemi SZ, Zare M, Ghaemmaghami P. Hysterosalpingography Findings in Infertile Women and Their Relationship with Demographic Variables: A Retrospective Study. *Women's Health Bulletin*. 2023;10(3):173-81.