Original Article

A Five-Year Review of Hysterosalpingographic Findings at Lagos State University Teaching Hospital, Nigeria

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Abstract

Background
Infertility leads to stigmatization, marital instability, and enormous psychological stress. In recent times in Nigeria, there appears to be an upsurge in the number of couples investigated for infertility using hysterosalpingography (HSG).
Objective
To observe the trend of HSG findings at a foremost tertiary hospital in Nigeria.
Methods
The study was a retrospective assessment of HSG reports by radiologists. Using an inclusion criteria of patients who had an initial ultrasound scan prior to HSG as noted from radiologists reports, a sample size of 623 radiographs concluded between April 2014 to April 2019 was consecutively enlisted from a population of 2,624 cases. Patients' demographic information was extracted from their request cards and radiologists' reports.
Results
Patients were aged 22 – 54 (mean: 36.30 ± 6.00) years. Findings from hysterosalpingography showed that secondary infertility was more prevalent (n = 469, 75.3 %) and with fibroid (n = 176, 28.25%) as the most prevalent abnormality.
Conclusions
There were more cases of secondary infertility presenting for HSG at the facility, and the major finding was fibroid. Although the ages of patients presenting for HSG investigations at the centre had increased, secondary infertility remained the more prevalent type, but with minimal drop in percentage.

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Keywords: Infertility, Hysterosalpingography, Uterus, Fallopian tubes, Fibroid

Introduction

Infertility is defined as the failure to achieve conception after a minimum of 12 months of regular, unprotected sexual intercourse. The condition is medically subdivided into primary and secondary with the former representing an absence of conception whatsoever, while the latter represents a subsequent inability to conceive after a previous one.[1] Congenital anomalies, diseases of the reproductive tract, and hormonal imbalance are broad-based reasons for infertility, but in practical terms, the key indicator reason is tubal blockage. [2, 3]

The prevalence of infertility in Nigeria ranges from 4 % to 48.1 % and although education may be an underlying factor for seeking medical attention, there is sparse evidence to suggest that infertility is influenced by religion, tribe, education, weather, or locality.[1,4,5] The African traditional society places a high importance on fecundity.[6] Infertility, therefore, is seen as personal tragedy and may lead to suicidal tendencies,[2] stigmatization, marital instability, and enormous psychological stress.[1,6] Despite a Nigerian population estimated to be over 200 million persons, the zeal by couples to procreate profusely appear to be a key performance indicator in marriage.[7]

In recent times, perhaps due to education and enlightenment, there appears to be an upsurge in the number of couples turning to orthodox medicine for help, with radiological investigations like hysterosalpingography (HSG) playing key roles. Hysterosalpingography is an x-ray-based, invasive, evaluation of the uterine cavity and fallopian tubes for infertility.[6,8] Other indications for HSG include postoperative evaluation of tubal ligation or reversal of tubal ligation, congenital anomalies, polyps, leiomyomas, surgical changes, synechiae, adenomyosis, tubal occlusion, hydrosalpinx, and peritubal adhesions, and other conditions. Its primary role, however, is in the evaluation of fallopian tubes.[8] The sensitivity and specificity of HSG are noted to be quite high thereby making it a popular method of investigation, despite the inherent radiation risks.[6,9,10] Sensitivity measures the number of people who truly have the disease who test positive, whereas specificity measures the number of people who do not have the disease who test negative.[2]

Lagos city in Nigeria is reputed to be the most populated in Africa with a population of about 14 million persons. Results from this work can therefore, be extrapolated to any other city in Africa. The Lagos State University Teaching Hospital (LASUTH), although one out of several in the city, is considered to be one of the busiest.[7] It was established in 2001 to cater for a population of ≥ 14,000,000 persons.

A previous work carried out by other authors in the department between 2008 - 2011 reported that the mean age of HSG patients was 34.58 years (range: 27 and 42 years) and with secondary infertility as the most prevalent (86.96 %)[11] One decade later, the department had moved fully from analogue into digital technology and the staff strength of radiologists and radiographers had improved.[9] The new technology and extra workforce has enabled the radiology department to have more throughput of HSG patients. This in turn may extend the spectrum of findings on HSG. This work will contribute to the national datapool on disease surveillance as well as be a ready source of data for researchers on HSG in the facility. The present work is replicated to observe the trend of HSG findings at a foremost tertiary hospital in Nigeria.

Materials and Methods

Study design and settings

This study was retrospective and involved radiographs of HSGs concluded and reported between April 2014 and April 2019. The study was undertaken at the Radiology Department of Lagos State University Teaching Hospital (LASUTH), Nigeria. It is one of six tertiary hospitals in the city and a busy one. The radiology department has a retinue of radiologists, radiology residents, radiographers, radiography interns, nurses and other ancillary staff. The department is also equipped with film-screen radiography (FSR), computed radiography (CR), direct digital radiography (DDR), mammography, computed tomography (CT), magnetic resonance imaging (MRI) and ultrasound.

Study population

The study population (N) was radiographs and radiologist reports of women referred to radiology department for infertility investigation with the use of hysterosalpingography (HSG). From April 2014 – April 2019, there were two thousand, six hundred and twenty-four (2,624) patients for HSG.

Inclusion criteria for this study included an indication of infertility on the request card, a specific request for HSG, and an initial ultrasound scan prior to HSG as noted from radiologists reports. After filtering off patients who did not meet the inclusion criteria, eventually a sample size of 623 radiographs, which represented the remainder, was enlisted.

Data collection

Each HSG procedure had been carried out by a team comprising radiographers, radiologists and nurses, and an average of 500 HSG cases had been done at the centre each year. Specific technique for HSG was as described in the literature.[2,11] Patients' records were available in a wallet containing their request cards, images and radiologists reports. This was stored in film archive. Researchers had a prepared data collection sheet. Each folder from April 2014 to April 2019 was scrutinized. If they met inclusion criteria, data was extracted from both request cards and radiologist's reports onto the data collection sheet.

Data analysis

Data was analyzed with the aid of Statistical Package for Social Sciences, version 21 (SPSS inc., Chicago, Illinois, USA). There were both descriptive and analytical components. Descriptive statistics include frequency, percentage, mean, range, tables and charts, while inferential statistics used was Pearson correlation analysis. The correlation was done to investigate the relationship between age and infertility since subjects were on an age spectrum of very young to middle age. They were stratified into age groups according to decade.

Ethical considerations

Ethical approval was obtained from the Institutional Ethical Committee (LASUTH/LREC/06/10/1151).

Results

As shown in Table 1, a total of 2,624 HSG cases (N) of patients aged 22 – 54 (mean: 36.30 ± 6.00) years were done within the 5-year period (2014 – 2019). A sample size of 623 cases (n) was drawn from this with secondary infertility being more prevalent (n = 469, 75.3 %). When ages were stratified into a 10-year range, the modal group was the 31 - 40year age range (n = 365, 58.5 %, mean: 35.25 ± 2.71).

Table 1. Demographic characteristics of patients

Parameter	Infertility type		Total
	Primary	Secondary	
Population (N)	678	1,946	2,624
Sample size (n)	154 (24.7 %)	469 (75.3 %)	623
Age range (year)	25 - 54	22 - 46	22 - 54
Mean ± SD (of age)	38.14 ± 6.25	34.71 ± 8.35	36.30 ± 6.00
Age categorizations (years)			
Category	Frequency	Percentage	Mean
21 - 30	128	20.5	27.86 ± 2.18
31 - 40	365	58.5	35.25 ± 2.71
41 - 50	121	19.5	43.86 ± 2.60
51 - 60	9	1.5	52.00 ± 1.18
Total	**623**	**100**	**36.30 ± 6.00**

Hysterosalpingography findings were in three broad sites of cervix, uterus and fallopian tubes. Tubal factors accounted for most cases of infertility (n = 273, 40.61 %). However, fibroid from uterine factor, was the most common finding (n = 176, 28.25%). This is summarized in Table 2.

Table 2. Hysterosalpingography (HSG) findings (specific)

Infertility factors	Frequency (n)	Percentages (%)
Tubal factor	273	40.61
Uterine factor	265	38.04
Cervical factor	85	21.35
Total	**623**	**100**
Specific findings		
Fibroids	176	28.25
Cervical stenosis	85	13.64
Left tubal occlusion	67	10.75
Right hydrosalpinx	65	10.44
Right tubal occlusion	58	9.31
Uterine adhesion	58	9.31
Left hydrosalpinx	43	6.90
Bilateral tubal occlusion	40	6.42
Polyps	22	3.53
Congenital anomalies	9	1.45
Total	**623**	**100**

An inferential test to find relationship between age and infertility was done using Pearson correlation method as shown in Table 3. Age correlated moderately and in direct proportion with infertility (r = 0.443, p = 0.001). An indication that as age increased or decreased, infertility increased or decreased. This result is confirmed by the correlation amongst 51 – 60 year olds, where a negative strong relationship was returned (r = -0.750, p = 0.20).

Table 3. Test of relationship between age and infertility type using Pearson correlation method

Parameter	r	Clinically significant	p	Statistically significant	Remarks
Age vs Infertility	0.443	Yes	0.001	Yes	Age and infertility are directly proportional
21 – 30 vs infertility	-0.023	No	0.813	No	No relationship
31 – 40 vs infertility	0.447	Yes	0.001	Yes	Moderate relationship
41 – 50 vs infertility	0.305	Yes	0.001	Yes	Mild relationship
51 – 60 vs infertility	-0.750	Yes	0.020	Yes	From 51 years and above, infertility reduces

Discussion

This study analyzed the results of 623 women who underwent HSG examinations between 2014 to 2019 at the Lagos State University Teaching Hospital (LASUTH), Lagos, Nigeria. They were aged 22 to 54 years with a mean age of 36.30 ± 6.00 years. The 31 - 40 year age range were the most frequent patients for HSG investigation of infertility (n = 365; 58.5 %; mean: 35.25 ± 2.71).

The age range of patients seen in the current study (22 to 54 years) was larger than that seen in a similar study a decade earlier at the same facility (27 – 42 years; mean:34.58 years).[11] Although the mean age of patients from the present study was the highest seen in the locality (36.30 ± 6.00 years), it fell within the same range of 30 – 40 years with similar works from the country. [11 – 14] However, there are works from northern Nigeria that reported a lower age range.[1, 10]

The > 42 year ages seen in the present study may be an indication that investigation of infertility through HSG was growing in popularity. In addition, perhaps, a positive management outcome may have also encouraged the older patients (≥ 42 years) to appear for the investigation. The upper limit of age (54 years) in the present study may be a hint of how late menopause occurs in the population. The implication of these findings is that infertility was present across the strata of reproductive age.

It was observed that secondary infertility had a higher prevalence (n = 469, 75.3 %) in the population. Hysterosalpingography was able to reveal abnormalities of the fallopian tubes (n = 273, 40.61%), much more than uterus (n = 265, 38.04) and cervix (n = 85, 21.35%). The most common pathology however, was fibroid from uterine factor (n = 176, 28.25%). Tubal pathology were more common (n = 273; 40.61%) in this study compared to uterus (n = 265; 38.04%) and cervix (n = 85; 21.35%) and with fibroid as the most common challenge (n = 176; 28.25 %). Our finding in this regard is in concordance with the majority of works in the locality which saw tubal blockage as the single major cause of infertility.[1,3-6,10 -14] Since HSG is basically for investigation of tubal patency,[8] this finding is not unexpected. Since fibroid seems to play a huge role in the pathologies seen on HSG, adequate attention should be paid to all parts of the uterus and adnexa.

In the previous work at the facility,[11] just like ours (75.3 %), secondary infertility was noted to have higher prevalence rate (86.96%). There was however, a 13.4% reduction over the decade as shown by our prevalence rate. This difference might not be particularly striking since the findings are similar. Perhaps an attempt to investigate the location of patients presenting for HSG may have shed some illumination on the difference noted because a work carried out amongst Pakistani population indicated that location had a role to play as rural-based patients had more infertility-related cases than their urban counterparts.[2] Our current work, as well as previously cited Nigerian works, were unable to differentiate rural from urban-based patients due to its retrospective design, unlike the Pakistani one which was carried out prospectively and took detailed history from patients. It is possible that future works done prospectively may find correlation between location and other social variables with infertility.

It is also noteworthy that the highly invasive HSG procedure has become quite a common method of investigating infertility in Nigeria. [1,12,13,14] That patients are also willing to take the additional risk of irradiation from a carcinogen like x-ray [7,15] suggests a changing trend from belief in superstition to dependence on orthodox medical practice. If this trend is sustained, health indices like life expectancy and morbidity are expected to improve in Nigeria, and indeed in Africa. [7] In addition, it is speculated that HSG has both therapeutic and diagnostic value as certain minor uterine adhesions and partial tubal occlusion are lysed leading to an increase in pregnancy rate in the months after Hysterosalpingography without any other gynaecological intervention.[8]

This window of hope may have motivated some patients to go to hospital. It was also revealed through Pearson correlation that age had a moderate relationship with infertility in the entire population. This relationship was both clinically (r = 0.443), and statistically significant (p = 0.001). The positive correlation indicates that as age increased, infertility also increased, and the relationship is statistically significant ($p \leq 0.05$). When the correlation between age and infertility was tested according to a 10-year age grouping, clinical and statistically significant relationship was found in both the 31 – 40 years group (r = 0.447, p = 0.001) and 41 – 50 years group (r = 0.305, p = 0.001). Likewise, in the 51 – 60 years group, the relationship was strong but negative (r = -0.750) and statistically significant (p = 0.020). This shows that at that age and higher, infertility reduces. This is expected since older women presented for HSG sparingly. There was no relationship whatsoever in the 21 – 30 years group (r = -0.023, p = 0.813). The poor relationship in the youngest age group of 21 – 30 years

suggests that age had no influence on infertility. That presupposes morbidity and co-morbidities should be the primary culprit.For the oldest group (51 – 60 years) on the other hand, age had a role to play in infertility as shown by the negative correlation (r = -0.750). The implication is that age should be considered where a normal HSG result is seen.

There were a few limitations in this work. The retrospective nature of the work did not give room for interaction with patients to further ascertain their real ages, their reasons for coming to hospital, and whether they were rural or urban-based. Furthermore, data used by previous researchers were re-used by our team as there is no clear way to demarcate them.

Conclusion

In conclusion, there was a larger age latitude of patients presenting for HSG investigations at LASUTH. Most patients had clinical impression of secondary infertility and the most common pathology discovered was uterine fibroid. At the facility, the findings over the years remain fairly similar.

Conflict of interest
None

Funding
None

Author's contribution
AJI conceptualized the work, got ethical approval and collected data. CCO guided AJI in each step of the work and also reviewed it. JAD and THO reviewed the work.

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