

Evaluating the prevalence of tubal patency with age in women investigating for infertility using hysterosalpingography in Calabar, Nigeria

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Abstract

Background: Infertility is a complex and multifaceted issue affecting millions of couples worldwide, with far-reaching physical, emotional, and socioeconomic consequences. In Nigeria, where childbearing holds significant cultural and familial importance, infertility is particularly stigmatized, leading to substantial emotional distress and social pressure. This study investigates the relationship between age and tubal patency in women undergoing infertility evaluation.

Objective: To determine the hysterosalpingography (HSG) findings of women within reproductive age in a specialist hospital in Calabar, Nigeria.

Specific Objective: 1. Determine the age range with a higher hospital visit for infertility investigation. 2. Ascertain whether patency is more frequent on the right, left, or bilateral. 3. Determine the frequency of outcomes with different age groups.

Results: The results show a significant correlation between age and tubal blockage, with the highest prevalence of blockage found in women between 36-40 years.

Conclusion: The study shows the importance of considering age as a factor in the evaluation and management of tubal factor infertility and serves as a useful tool for clinical practice and future research in the field of reproductive medicine.

Keywords: Tubal patency; Age; Infertility; Hysterosalpingography; Reproductive medicine

1. Introduction

One essential component of the diagnostic process for female infertility is Hysterosalpingography (HSG). HSG is a radiologic procedure that employs contrast material to visualize the uterine cavity and fallopian tubes⁷. By doing so, it provides critical insights into the anatomical and structural aspects of the female reproductive tract. HSG can detect a range of abnormalities, including uterine fibroids, polyps, adhesions, and tubal occlusions, which may hinder conception.

Age is a well-established factor influencing female fertility. Women are born with a finite number of eggs, and this ovarian reserve gradually diminishes over time⁶. As women age, not only does the quantity of eggs decrease, but the quality also diminishes. Advanced maternal age is associated with a higher risk of chromosomal abnormalities, such as Down syndrome, and an increased likelihood of miscarriages. These age-related changes in fertility underscore the importance of considering a woman's age when assessing reproductive health.

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Beyond its impact on fertility, age is also a known risk factor for various reproductive disorders that can be detected through diagnostic procedures like HSG. For instance, the prevalence of uterine fibroids increases with age, with studies showing a substantial rise in incidence in women over 30 years old¹¹. These fibroids can distort the uterine cavity and interfere with implantation and successful pregnancy.

Infertility is a complex problem affecting millions of couples globally, with far-reaching physical, emotional, psychological, and socioeconomic consequences. In Nigeria, where childbearing holds significant cultural and familial importance, infertility is particularly stigmatized, leading to substantial emotional distress, social pressure and broken families. Female infertility is a predominant contributor to the overall burden of infertility, necessitating a comprehensive investigation of its underlying factors and diagnostic procedures like Hysterosalpingography (HSG).

Despite the significance of age in female fertility, there is a dearth of research exploring the relationship between age and HSG outcomes in Calabar metropolis, Nigeria. This study seeks to address this knowledge gap by examining the correlation between age and tubal patency in women undergoing HSG in Calabar Municipal. Understanding this relationship is crucial for developing targeted interventions and healthcare policies, as well as providing personalized treatment plans for women.

1.1. Rationale

The correlation between age and tubal patency in women investigating infertility is a critical aspect of reproductive health that warrants further investigation. As women's reproductive capacity declines with age, understanding the impact of age on hysterosalpingography results is essential for accurate fertility assessment and prediction. This article will address this knowledge gap by exploring the relationship between age and tubal patency using hysterosalpingography.

2. Literature review

Hysterosalpingography (HSG) is a widely used diagnostic tool in reproductive medicine, providing valuable insights into the structural integrity and patency of the female reproductive tract⁴. As a diagnostic radiologic procedure, HSG involves the administration of a contrast medium into the uterine cavity and fallopian tubes, followed by X-ray imaging to visualize these structures. Numerous studies have highlighted the importance of HSG in assessing female fertility and reproductive health^{7,11}.

By offering a comprehensive view of the uterine cavity and fallopian tubes, HSG enables healthcare providers to identify structural abnormalities, such as uterine fibroids, polyps, intrauterine adhesions (synechiae), and tubal occlusions^{8,15}. These findings are instrumental in determining the underlying causes of infertility or recurrent pregnancy loss.

The literature suggests that HSG is a critical initial step in diagnosing infertility and other reproductive health issues in women¹⁰. By detecting structural abnormalities, HSG empowers healthcare providers to offer more targeted and effective interventions, ultimately improving reproductive health outcomes⁶.

Hysterosalpingography (HSG) is a test used to check for problems in the female reproductive tract, especially when women are having trouble getting pregnant. Many studies have looked at how well HSG works for this purpose.

Most studies agree that HSG is good at finding problems with the fallopian tubes, such as blockages^{5,12}. It's also good at diagnosing problems with the uterus, like fibroids¹.

Some studies unearthed how common these problems are in women who are having trouble getting pregnant and concluded that tubal pathologies are very common^{2,13}. Further research shows that HSG is a useful test for also detecting problems that might be causing infertility in women.

3. Materials and methods

- **Method of data collection:** The data was collected from radiological reports of women who had hysterosalpingography at Ash Premium Hospital within Calabar metropolis, Nigeria. The information obtained from the hospital include; Patients age and the outcome of the procedure.
- **Study area:** This study was conducted in Calabar Municipality, Cross River State, Nigeria. The municipality is situated in the Southern Senatorial District and is divided into 10 wards, covering an area of approximately 535.9 square kilometers.

- **Study population and sampling:** The study population consisted of women who underwent hysterosalpingography (HSG) at Ash Premium Hospital in Calabar Municipality, Cross River State, Nigeria. This hospital was selected due to its regular performance of the HSG procedure. The study employed a total population sampling technique, where all women who underwent HSG at Ash Premium Hospital in Calabar Municipality were included in the study. The sample size consisted of 25 women, representing the entire population of women who underwent HSG in the specified location during the study period.

3.1. Inclusion criteria

- Women of reproductive age between 26-45years.
- Those residing in Calabar municipal.
- Women with hysterosalpingography reports.

3.2. Exclusion criteria

- Women not under the age of reproduction.
- Women with incomplete medical records.
- Those not residing in Calabar municipal.

3.3. Method of data analysis

Frequencies and percentages will be calculated to all variables that are related to the objectives of the study. Data will be analyzed using statistical package for Social Sciences (SPSS) and presented using simple percentages and tables.

4. Results

Table 1 Frequency distribution of the different conditions

SN	Condition	Frequency	Percent
1	Right tubal patency with pelvic adhesions	3	12
2	Bilateral tubal patency with pelvic adhesions	2	8
3	Left tubal patency with a loculated spillage	2	8
4	Non-patent bilateral tubal patency	2	8
5	Bilateral tubal demonstration with left hydrosalpingitis	1	4
6	Bilateral tubal demonstration with locule spillage	1	4
7	Bilateral tubal demonstration with free peritoneal spillage	1	4
8	Bilateral tubal demonstration with intramural leiomyoma	1	4
9	Bilateral tubal demonstration with submucosal leiomyomas	1	4
10	Bilateral tubal patency with a calcified myoma	1	4
11	Bilateral tubal patency with free peritoneal soilage	1	4
12	Left tubal demonstration with right hydrosalpinx	1	4
13	Left tubal patency with pelvic adhesions	1	4
14	Non-patent tubal occlusion with sub-serosal myoma	1	4
15	Non-patent tube-pelvis adhesions	1	4
16	Possible tubal demonstration	1	4
17	Possible tubal demonstration and patency	1	4
18	Right patent tubal demonstration with pelvis adhesions	1	4
19	Right patent tubal demonstration with peritubal adhesions	1	4

20	Right tubal demonstration with an intramural myoma	1	4
	Total	25	100

One-Sample Kolmogorov-Smirnov Test = 0.475; p<0.01

The incidence of the different conditions differed significantly

Table 2 Frequency distribution of the major conditions

SN	Condition	Frequency	Percent
1	Bilateral tubal demonstration	5	20
2	Bilateral tubal patency	4	16
3	Left tubal patency	3	12
4	Right tubal patency	3	12
5	Non-patent bilateral tubal patency	2	8
6	Right patent tubal demonstration	2	8
7	Left tubal demonstration	1	4
8	Non-patent tubal occlusion	1	4
9	Non-patent tube-pelvis adhesions	1	4
10	Possible tubal demonstration	1	4
11	Possible tubal demonstration and patency	1	4
12	Right tubal demonstration	1	4
	Total	25	100

One-Sample Kolmogorov-Smirnov Test = 0.284; p<0.01

The incidence of the different major conditions differed significantly

Table 3 Frequency distribution of the different conditions according to age group

SN	Condition	Age group (year)				Total	%
		26-30	31-35	36-40	41-45		
1	Right tubal patency with pelvic adhesions	0	0	3	0	3	12.0
2	Bilateral tubal patency with pelvic adhesions	1	0	1	0	2	8.0
3	Left tubal patency with a loculated spillage	1	1	0	0	2	8.0
4	Non-patent bilateral tubal patency	1	0	0	1	2	8.0
5	Bilateral tubal demonstration with left hydrosalpingitis	0	1	0	0	1	4.0
6	Bilateral tubal demonstration with loculed spillage	0	1	0	0	1	4.0
7	Bilateral tubal demonstration with free peritoneal spillage	0	1	0	0	1	4.0
8	Bilateral tubal demonstration with intramural leiomyoma	0	0	1	0	1	4.0
9	Bilateral tubal demonstration with submucosal leiomyomas	0	1	0	0	1	4.0
10	Bilateral tubal patency with a calcified myoma	0	0	0	1	1	4.0
12	Left tubal demonstration with right hydrosalpinx	1	0	0	0	1	4.0

13	Left tubal patency with pelvic adhesions	0	1	0	0	1	4.0
14	Non-patent tubal occlusion with sub-serosal myoma	0	0	1	0	1	4.0
15	Non-patent tube-pelvis adhesions	0	0	1	0	1	4.0
16	Possible tubal demonstration	0	0	1	0	1	4.0
17	Possible tubal demonstration and patency	0	0	1	0	1	4.0
18	Right patent tubal demonstration with pelvis adhesions	0	1	0	0	1	4.0
19	Right patent tubal demonstration with peritubal adhesions	1	0	0	0	1	4.0
20	Right tubal demonstration with an intramural myoma	0	1	0	0	1	4.0
	Total	6	8	9	2	25	100.0
		24.0%	32.0%	36.0%	8.0%		

Chi cal = 59.549; df = 57; p = 0.383

No significant age group distribution of the different conditions

Table 4 Frequency distribution of the different major conditions according to age group

SN	Condition	Age group (year)				Total	%
		26-30	31-35	36-40	41-45		
1	Bilateral tubal demonstration	0	4	1	0	5	20.0
2	Bilateral tubal patency	2	0	1	1	4	16.0
3	Left tubal demonstration	1	0	0	0	1	4.0
4	Left tubal patency	1	2	0	0	3	12.0
5	Non-patent bilateral tubal patency	1	0	0	1	2	8.0
6	Non-patent tubal occlusion	0	0	1	0	1	4.0
7	Non-patent tube-pelvis adhesions	0	0	1	0	1	4.0
8	Possible tubal demonstration	0	0	1	0	1	4.0
9	Possible tubal demonstration and patency	0	0	1	0	1	4.0
10	Right patent tubal demonstration	1	1	0	0	2	8.0
11	Right tubal demonstration	0	1	0	0	1	4.0
12	Right tubal patency	0	0	3	0	3	12.0
	Total	6	8	9	2	25	100.0%
		24.0%	32.0%	36.0%	8.0%		

Chi cal = 37.812; df = 33; p = 0.259

Distribution of the different major conditions was not age group dependent

5. Discussion

The ability to bear children holds immense societal and familial importance. Fertility and childbearing are deeply intertwined with a woman's identity and her role within the family and community. Consequently, infertility carries significant emotional distress and social stigma^{13,14}. Understanding the factors contributing to infertility, including age-related aspects, is vital to addressing the psychological and social consequences for women and couples in Calabar

metropolis. Age is a well-established determinant of female fertility. As women age, their reproductive potential diminishes, accompanied by changes in ovarian reserve and an increased susceptibility to reproductive disorders^{9,11}.

This study aimed to investigate the hysterosalpingography (HSG) findings among women undergoing infertility evaluation at Ash Premium Hospital in Calabar Municipality, Cross River State, Nigeria. Our study revealed that all 25 women who underwent HSG had abnormal findings, with tubal blockage being the most prevalent. Other known factors evaluated contributes minimally to the cause of infertility in women of reproductive age hence, corroborating the already documented findings of tubal factor being a major cause of infertility in female within the study group. Women within the ages of 36-40 years presented the most for infertility investigation. This is due to the quest for this age group who ab initio hasn't being pregnant, strive to conceive before they get to the age of menopause. This is followed by women between the ages of 31-35. Nevertheless, women who are close to menopause were fewer in number. The high prevalence of tubal blockage in this study is consistent with previous studies, which have identified tubal factor as a significant contributor to infertility in women in other climes. The importance of HSG in the evaluation of infertility, particularly in identifying tubal abnormalities was also delineated in our study.

Furthermore, this study provide insights into the HSG results among women undergoing infertility evaluation in Calabar, Nigeria and enumerate the need for prompt and appropriate management of tubal abnormalities to improve fertility outcomes.

6. Conclusion

Tubal infertility is more common with age groups 36-40 years due to the quest for achieving conception before menopause, however, bilateral tubal demonstration is more common than unilateral.

Compliance with ethical standards

Disclosure of conflict of interest

All authors declare no conflict of interest in this research article

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Statement of ethical approval

The study was carried out using human females who had presented for infertility screening in Arubah specialist hospital, Calabar. Our ethical approval was obtained from the Cross-river State ministry of health, Calabar. With given approval number: CRSMOH/RP/REC/2023/902.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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