

A COMPARATIVE STUDY ON HYSTEOSALPINGOGRAPHY FINDINGS BETWEEN YOUNG-AGED AND MIDDLE-AGED WOMEN AT A TERTIARY HEALTH FACILITY IN NIGER-DELTA REGION.

ABSTRACT

Background: Hysterosalpingography (HSG) is an important imaging modality in Radio-diagnosis for the evaluation of the female uterine cavity and the fallopian tubes. HSG is still actively in use as it is cheap, readily available and easy to interpret.

Objective: The aim of this study **to** is compare the indications for HSG and its findings between Young-Aged and Middle-Aged women in a typical Nigerian tertiary hospital.

Methods: A retrospective study and analytical design was employed in this study. A total of 266 patient's data was used, 133 in each group respectively. A *P*-value below 0.05 was considered statistically significant.

Results: Two-hundred and sixty-six women were studied with 133 in each age group over a 5-month period. Those ≤ 35 years were categorized as young-aged and > 35 years categorized as middle aged women respectively. Secondary infertility is seen more in the middle-aged women (n=92, 69.2%) and primary infertility more in the younger-aged group (n=5, 3.8%). Overall, uterine abnormalities were more in the young-aged (69, 51.9% vs 66, 49.6%). Tubal abnormalities ranked highest among HSG findings (153, 57.5%) and is more common in the middle-aged women (n=89, 66.9% vs 64, 48.1%). There was significant association between age and tubal abnormalities (P=0.002)

Conclusion: HSG is still relevant in the evaluation of women within the reproductive age range. Infertility is the most frequent indication in this study, with secondary infertility seen more in the middle-aged women group. Uterine fibroid is commoner in middle-aged women while uterine synechiae occurs more in young-aged women. Tubal occlusion is the commonest of the tubal pathology and only tubal abnormalities had significant association with age, with this pathology being more likely in middle-aged women.

Keywords: Comparative, Young-Aged, Middle-Aged, Women, Hysterosalpingography

INTRODUCTION:

HSG is commonly used to study the framework of uterine cavity and ascertain the patency of fallopian tubes. To correctly evaluate females presenting to gynaecological clinics with complaints related to infertility, it is central to ascertain that the fallopian tubes are not blocked. Hysteroscopy and laparoscopy with chromoperturbation (HLC) is currently the gold standard because of its advantage in assessing the uterine cavity alongside the tubal status while also having the capabilities of providing appropriate treatment. [1] But, in low-income countries these techniques are not readily available, are expensive and the prerequisite skilled personnel are in short supply. HSG arguably remains the core and forefront investigation for infertile patients, while sonohysterography is hardly ever done. [2] Recently, laparoscopy is said to be well thought-out as the reference standard investigation in infertility workup plan, however HSG can be done first, while the use of laparoscopy can be restricted to cases with causes such as endometriosis and peritubal adhesions.[3] Previous studies[3-4] have shown that HSG has a very high yield in excluding tubal factor, even when endoscopic evaluation is on hand. The curative benefits of HSG have been documented with testimonials of some patients getting pregnant after undergoing HSG and the less invasive nature of the procedure is also appealing.[4-5] However, HSG is an ionizing radiation based study which limits its use and it is also unable to show uterine walls and adnexal structures. This limitation gives room for other imaging modalities such as ultrasonography, hysterosonography and magnetic resonance imaging (MRI) to be employed in the investigation of the female reproductive system.

Age is an important factor for reproduction. The female reproductive age ranges from 15-45years and the peak age ranges from 25-35years, hence the aim of this study is to compare the indications and the HSG findings between different age groups.

MATERIALS AND METHODS:

The study was conducted at the Radiology department, and the Obstetrics and Gynaecology Department of RSUTH, South-South Nigeria. The records of patients who presented for hysterosalpingography for diverse reasons between 1st January, 2022 and 31st May, 2022 were studied. The Biodata, indications for the investigation and the HSG findings were obtained and documented. Pelvic inflammatory disease (PID) is a contraindication to performing a HSG, thus any suspected case of PID is referred back to the gynaecological clinic for proper treatment before rebooking during within the first ten days of her next menstrual cycle. Request forms with no written indication for the study were excluded.

Ethical approval is not considered necessary in this kind of study

Sample size calculation: The formula for analytical design was employed to attain a sample size of 133 per group. [6]. This was obtained based on an alpha of 0.05, beta of 0.10, proportion of HSG abnormality in younger age group of 35.6% from the study by Itanyi and Oluseyi, [6] and effect size of 15%.

Data analysis: The IBM Statistical Package for Social Sciences (SPSS) version 21.0 for Windows was employed in statistical analysis. Normality of data was assessed prior to analysis. Data were normally distributed, thus parametric test were employed in the study. Tables and charts were used to display data as appropriate. Frequencies and proportions were determined and comparisons across the two groups in the study performed using Chi Square/ Fisher's exact tests. A *P*-value below 0.05 was considered statistically significant.

RESULTS:

The study comprised of 133 young-aged women (categorized as women aged 35 years and below) and 133 middle-aged women (categorized as women aged above 35 years i.e. 35-49years).

Table 1: HSG indications between the two age-groups in the study

Indications	Study Groups		Total n (%)
	Younger age	Middle aged	
	≤35 years n (%)	>35 years n (%)	
Secondary infertility	89 (66.9)	92 (69.2)	181 (68.0)
Primary infertility	5 (3.8)	4 (3.0)	9 (3.4)
Uterine fibroids	24 (18.0)	30 (22.6)	54 (20.3)
Asherman's syndrome	8 (6.0)	5 (3.8)	13 (4.9)
Abnormal menstruation	6 (4.5)	2 (1.5)	8 (3.0)
Routine	1 (0.8)	0 (0.0)	1 (0.4)
Total	133 (100.0)	133 (100.0)	266 (100.0)

Fisher's Exact = 4.385; P-value = 0.493

Table 1 show that secondary infertility (92, 69.2%) is more frequent in the middle-aged women and primary infertility (5, 3.8%) is higher in the young-aged group. Uterine fibroid was higher in the middle-aged group

while Asherman`s syndrome and abnormal menstruations were more common in the young-aged group. Only one person from the young-aged group had HSG done as a routine investigation.

Table 2: Comparison between HSG findings and two age-groups in the study

HSG findings	Study Groups		Total n (%)
	Younger age ≤35 years n (%)	Middle aged >35 years n (%)	
Uterine abnormalities			
Yes	69 (51.9)	66 (49.6)	135 (50.8)
No	64 (48.1)	67 (50.4)	131 (49.2)
<i>Chi-Square = 0.135; p-value = 0.713</i>			
Tubal abnormalities			
Yes	64 (48.1)	89 (66.9)	153 (57.5)
No	69 (51.9)	44 (33.1)	113 (42.5)
<i>Chi-Square = 9.616; p-value = 0.002*</i>			
Cervical abnormalities			
Yes	2 (1.5)	7 (5.3)	9 (3.4)
No	131 (98.5)	126 (94.7)	257 (96.6)
<i>Fisher`s Exact p-value = 0.172</i>			

**Statistically significant*

Table 2 reveals the HSG findings between the age groups. Tubal pathology is the most common abnormality (153, 57.5%) and its commoner with the middle-aged group (89, 66.9%). Also, tubal pathology with age is statistically significant (P-value=0.002) in this study. The second commonest abnormality is seen in the uterus

and these are more common in the young aged group (69, 51.9%) but it's not significant statistically (P-value=0.713). However, cervical abnormality is seen more in the middle-aged group (7, 5.3%) also not statistically significant (P-value=0.172)

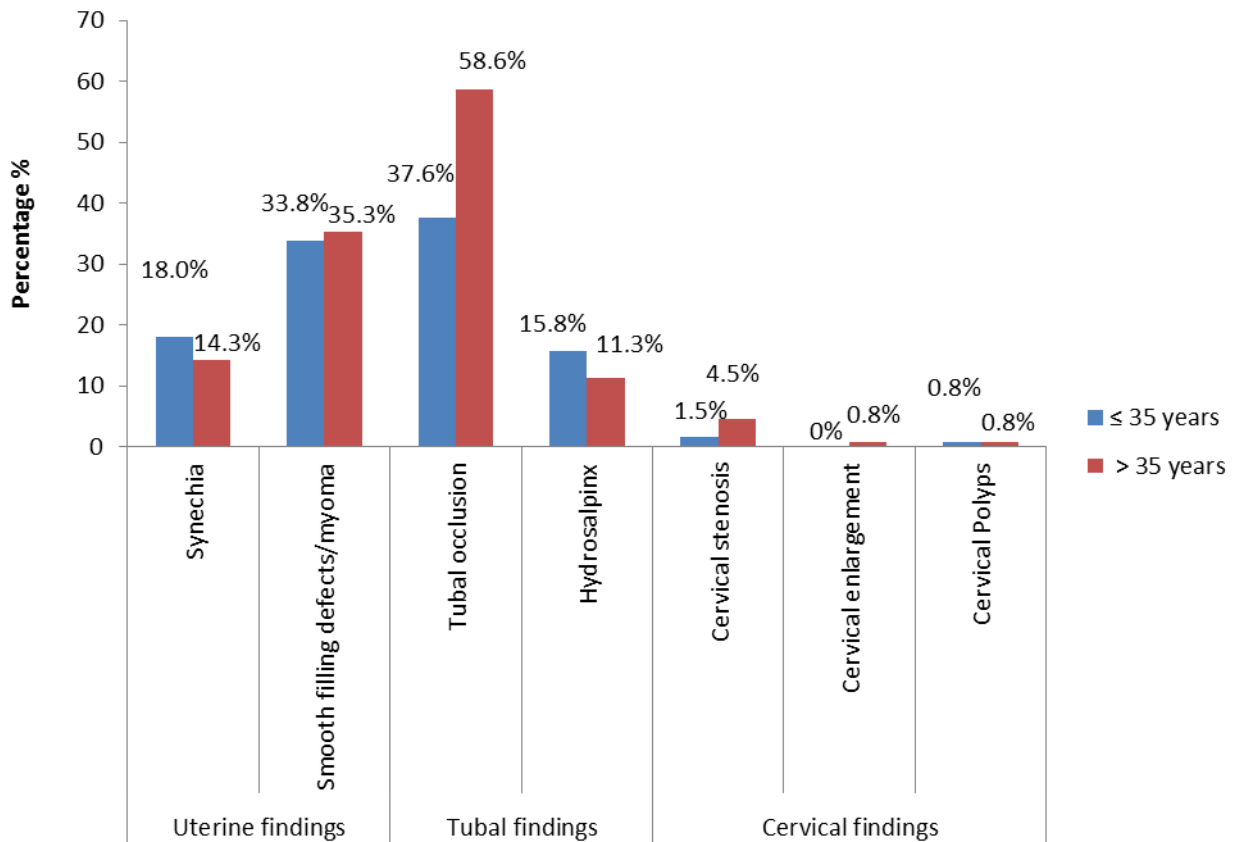


Figure 1: Bar chart showing HSG findings according to young-aged and middle-aged groups.

Figure 1 is a bar chart showing HSG findings with respect to the age which show that tubal occlusion is more common in the middle aged group (58.6%) while hydrosalpinx is noted more in the young aged group (15.8%). Myoma is seen more in the middle aged group (35.3%) while synechia is seen more in the young aged group (18.0%). Cervical abnormalities overall are commoner in the middle aged group.

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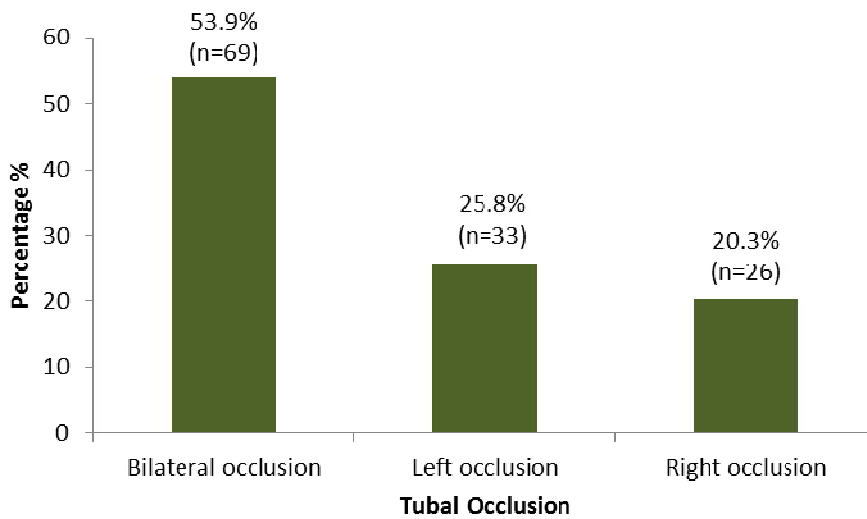


Figure 2: Tubal occlusion according to sides affected.

Figure 2 depict tubal occlusion, of which bilateral tubal occlusion is most prevalent (53.9%, 69) while unilateral left sided tubal occlusion accounting for 25.8% (33) is commoner than the right sided variety accounting for 20.3% (26).

Table 3: Hydrosalpinx findings from the women in the study

Hydrosalpinx	Frequency	Percentage
Bilateral	12	33.3

Left	19	52.8
Right	5	13.9
Total	36	100.0

Table 3 show that unilateral hydrosalpinx is more frequent generally, and mostly occurred on the left side (52.8%, 19), followed by bilateral hydrosalpinges (33.3%, 12), while the least frequent is right hydrosalpinx (13.9%, 5).

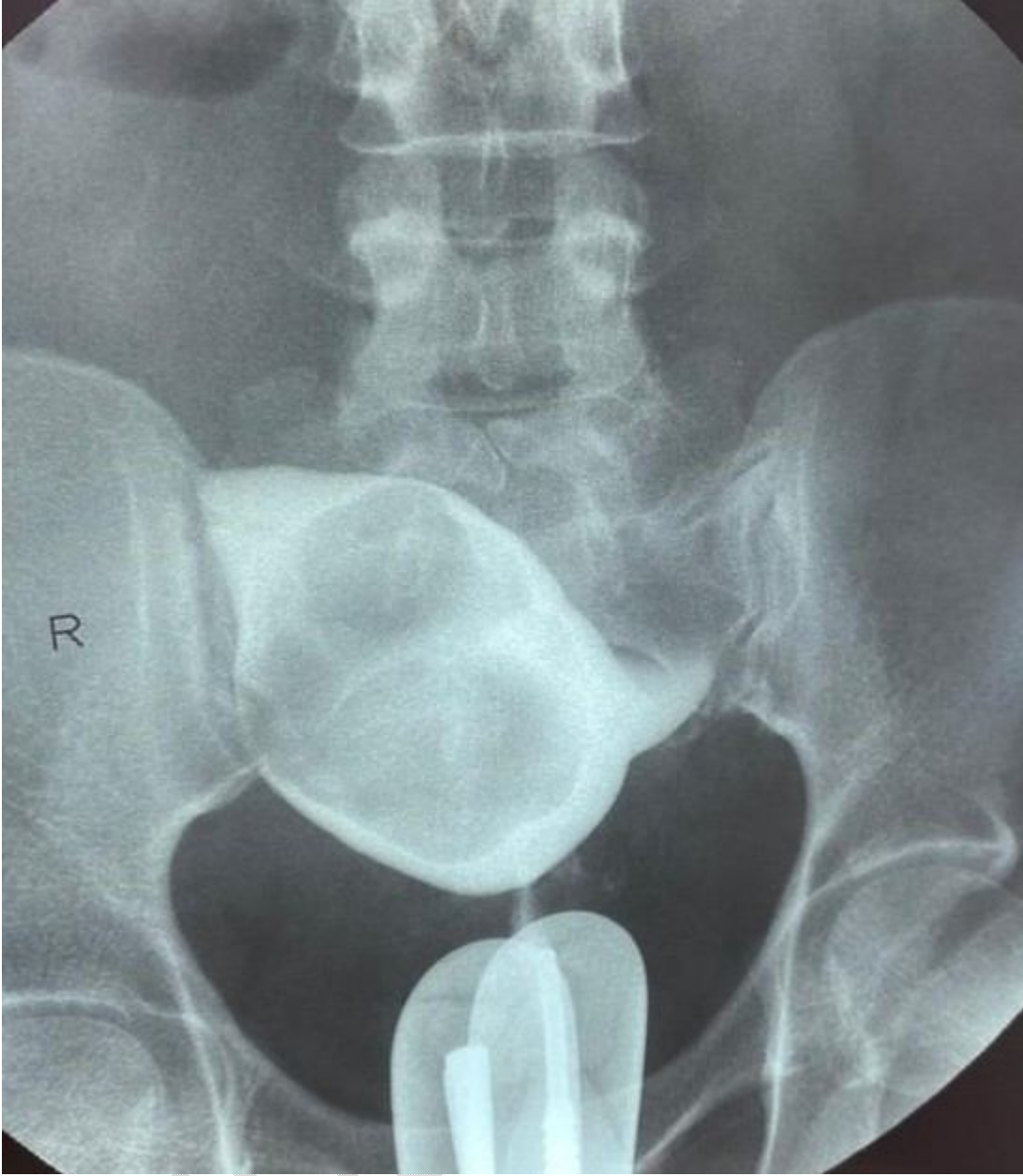


Figure 3: Showing enlarged contrast opacified uterus with multiple rounded filling defects of varying sizes, the proximal part of the left fallopian tube and the right fallopian tube is not visualized, which is in keeping with uterine fibroids and bilateral tubal occlusion.



Figure 4: Showing a contrast opacified uterus with no demonstration of both fallopian tubes, which is in keeping with bilateral tubal occlusion.



Figure 5: Showing a contrast opacified uterus with severely narrowed cavity and irregular outline, suggestive of severe uterine synechia.



Figure 6: Showing a contrast opacified uterus and demonstrated fallopian tubes are dilated and tortuous which is in keeping with bilateral hydrosalpinges..

DISCUSSION:

In this study, we found out that infertility was stated as the most frequent indication for HSG in the two groups. However, this is nonspecific as infertility needs to be classified as either primary or secondary. For adequately completed HSG request forms, secondary infertility is a more popular indication in the middle-age group (96, 72.2%) while primary infertility is higher in the younger age group (5, 3.8%). Overall, secondary infertility (181, 68.0%) is the commonest indication between the two groups, this agrees with previous studies.[6-15] The higher values of secondary infertility could be due to past pelvic inflammatory disease, postabortal sepsis and puerperal sepsis common in the Nigerian environment.[16] Other studies that supports pelvic infection as a contributing factor to higher prevalence of secondary infertility was noted in an India study by Patil et al[17] and in a Central

Africa study by Collet et al respectively.[18] In contrast to this study, other studies done in parts of Africa and Asia[19-21] documented that primary infertility is more prevalent than secondary infertility. Furthermore, Okafor et al[19] at Nnewi Nigeria, reported both uterine and cervical abnormalities as occurring more, querying the information volunteered by the women.

The young-aged group women had more of primary infertility in this study which is in agreement with some studies.[6,11,19] Conversely, a Sokoto study reported more indication of secondary infertility among women less than 35years of aged.[15]

In this study, uterine fibroid was the second commonest indication for HSG (n=54, 20.3%), higher in the middle-aged women (n=30, 22.6%) compared to young aged women (n=24, 18.0%). This agrees with Eze CU et al[10] findings (n=24, 11%), but in their study, age categorization was not done for study indications.

Asherman`s syndrome (n=8, 6.0%) and abnormal menstruation (n=6, 4.5%) were commoner indications in young-aged group women, both ranking third and fourth place in frequency of indications for HSG. This also supports the findings of the study done by Eze CU et al[10] for Asherman`s syndrome, however not in relation to age grouping as done in the index study.

In the index study, tubal abnormality was a major HSG finding in the two groups under study (n=153, 57.5%). Middle-aged women had more occurrence of tubal pathology (n=89, 66.9%) in comparison to young-aged women (n=64, 48.1%). The difference in prevalence between the two groups is of statistical significance with *P*-value of 0.002. Also, among the tubal abnormalities, tubal occlusion was the commonest and occurs more in the middle-aged women (58.6%). A possible hypothesis for these results may be due to the fact that women are more likely to have had poorly done termination of unwanted pregnancy when younger by quacks (since abortion is not legalized in our environment) and present later in middle age with chronic complication of tubal occlusion. Also patronage of

traditional birth attendants and religious houses for delivery purposes may lead to obstetric complications that result to tubal occlusion, synechiae, hydrosalpinx and cervical stenosis etcetera

Furthermore, bilateral tubal occlusion was more prevalent (n=69, 53.9%), and unilateral tubal occlusion is the next in line, with the left (n=33, 25.8%) more frequently affected than the right (n=26, 20.3%). Danfulani et al[15] and Adetiloye et al[22] reported right sided tubal occlusion as being more common, and attributed their findings to more surgical manipulations performed on the right due to appendectomy and its accompanying complications. This is in contrast to bilateral tubal occlusion which was predominantly found in this study, which is in keeping with some previous studies.[6,9,11,14,23-25] While the finding of right sided tubal occlusion popularity is corroborated by some studies [6,14,19], other studies[9,11] found left sided tubal occlusion to be more common than right sided tubal occlusion. Aduayi et al[9] and Akagbue et al[26] reported significant association with age and tubal occlusion which aligns with our findings in this present study. However, Itanyi US et al[6] in a study done in Abuja documented that there was no association with age and HSG findings.

Also in this study, hydrosalpinx was more rampant in the young-aged women (15.8%) compared to 11.3% for the middle-aged women, which formed part of the tubal abnormalities that showed significant association with age (p-value=0.002). Left sided hydrosalpinx is more common in this study (n=19, 52.8%) compare to either the right sided hydrosalpinx (n=5, 13.9%) or bilateral hydrosalpinges (n=12, 33.3%). These findings disagree with some previous studies[9,11,14,25] that documented right sided hydrosalpinx dominance. Eze CU et al[10] and Danfulani et al[15] in their separate studies reported bilateral dominance (n=14, 6%; n=12, 3.6%). On the other hand, our observations agree with some other investigators.[23,27-28]

In the index study, uterine abnormalities accounted for 135 (50.3%), in which 69(51.9%) was seen in the young-aged group and 66 (49.6%) was noted in the middle-aged women, however, this difference was not significant (P -value =0.713). Furthermore, myoma occurred more in the middle-aged women (58.6% vs37.6%) but uterine synechiae was more prevalent in the young-aged group (18.0% vs14.3%). This high incidence of uterine fibroids

supports the findings of previous studies.[9-10,11,14,19,25,29-30] This increased prevalence of myoma may be attributed to being black, and `empty womb syndrome`. This shows that fibroids are common in African women.[31] Bukar M et al[23] findings contradicts ours by reporting higher incidence of synechiae which they attributed to excessive curettage and infections. In a related study by Okafor et al[19], uterine synechiae was documented to be more in the middle-aged women which is in contrast to findings in this study.

In this study, cervical abnormalities were documented in 9(3.4%); out of which middle-aged women accounted for 7(5.3%) and young-aged women accounted for 2 (1.5%). This difference was not statistically significant (P -value=0.172). The index study showed that cervical stenosis is more prevalent in middle-aged women (4.5% vs 1.5%), cervical polyps has equal occurrence rate in both groups and cervical enlargement is seen in middle-aged women only (0.8%). This aligns with a Nnewi study conducted by Okafor et al[19] which documented more cervical abnormalities in women greater than 35years of age.

CONCLUSION:

Hysterosalpingography (HSG) is still relevant in the evaluation of women within the reproductive age range. Infertility is the most frequent indication in this study, with secondary infertility being the commonest indication among middle-aged women and young-aged women. Uterine fibroid is the prevalent uterine cavity abnormality, more commonly encountered in middle-aged women while uterine synechiae occurs more in young-aged women. Interestingly, tubal occlusion is the commonest of the tubal pathology and among all the HSG findings, only tubal abnormalities had significant association with age.

REFERENCES:

1. Luciano DE, Exacoustos C, Johns DA. Can contrast hysterosalpingo-sonography replace hysterosalpingography in confirming tubal blockage after hysteroscopic sterilization and in the evaluation of the uterus and tubes in infertile patients? *Am J Obstet Gynecol.* 2011;204(1):79-e1.
2. Aremu A, Adetiloye A, Ibitoye B, Adekanle D, Bello T. Transabdominal saline contrast sonohysterography: can it replace hysterosalpingography in low resource countries? *J Clinic Diagno Res.* 2012;6:239-42.
3. Den Hartog JE, Lardenoije CM, Severens JL Land JA, Evers JL Kessels AG. Screening strategies for tubal factor subfertility. *Hum Reprod.* 2008;23(8):1840-8.
4. Robabeh M, Roozbeh T. Comparison of hysterosalpingography and laparoscopy in infertile Iranian women with tubal factor. *Ginekol Pol.* 2012;83(11):841-3.
5. Waheed S, Mazhar R, Khan NH, Rafi M. The Comparison of Hysterosalpingography and Laparoscopy in Predicting Fertility *Anns*2007;13(3):202-5.
6. Itanyi UD, Oluseyi HO. Spectrum of hysterosalpingographic findings among women presenting with infertility in Abuja, Nigeria's capital. *Int J Reprod Contracept Obstet Gynecol* 2017;6(4):1583-89.
7. Ubeda B, Paraira M, Alert E, Abuin RA. Hysterosalpingography: spectrum of normal variants and non-pathological findings. *AJR Am J Roentgenol*2001;177(1):131-5.
8. Larsen U Primary and secondary infertility in sub-Saharan Africa. *Int J Epidemiol* 2000;29(2):285-91.
9. Aduayi OS, Akanbi GO, Akintayo AA, Aduayi VA. Hysterosalpingography findings among women presenting for gynaecological imaging in Ado-Ekiti, South Western Nigeria. *Int J Rreprod Contracept Obstet Gynecol* 2016; 5(6):1906-12. DOI: 10.18203/2320-1770ijrcog20161688.
10. Eze CU, Ohagwu CC, Abonyi LC, Njoku J, Iruhe N, Igbinedion FO. A spectrum of . hysterosalpingographic findings in infertile women in Benin City Nigeria. *J Reprod Infertil* 2013; 4(2):13-8. DOI: 10.5829/idosi.jri.2013.4.2.7692.

11. Kiridi EK, Oriji PC, Ugwoegbu JU, Abasi IJ. Hysterosalpingography Findings among Women Presenting for Infertility Evaluation in Bayelsa State, South-South Nigeria. *J Adv Med Res.* 2022;34(5):7-17 DOI: 10.9734/JAMMR/2022/v341531292
12. Kiguli-Malwade E, Byanyima RK. Structural findings at hysterosalpingography in patients with infertility at two private clinics in Kampala, Uganda. *Afr Health Sci* 1994;4(3):178-81.
13. Cisse R, Lougue C, Ouedraogo A, Thieba B, Tapsoba T, Ouedraogo CM.et al. Features of Hysterosalpingography performed in Burkina Faso *J Radiol.*2002;83(3):361-4.
14. Onwuchekwa CR, Oriji VK. Hysterosalpingographic (HSG) pattern of infertility in women of reproductive age. *J Hum Reprod Sci* 2017; 10(3):178-84. DOI:10.4103/jhrs.JHRS_121_16
15. Danfulani M, Ahmed S, Haruna Y. Hysterosalpingographic findings in women with infertility in Sokoto North-Western Nigeria. *Afr J Med Health Sci* 2014;13(1):19-23. DOI: 10.4103/2384-5589.139438
16. Bello TO. Tubal abnormalities on hysterosalpingography in primary and secondary infertility. *West Afr J Med* 2006;25(2):130-3.
17. Patil M Assessing tubal damage. *J Hum Reprod Sci* 2009;2(1):2-11.
18. Collet M, Reniers J, Frost E, Gass R, Yvert F, Leclerc A, Roth-Meyer C, Ivanoff B, Meheus A. Infertility in Central Africa: Infection is the cause. *Int J Gynecol Obstet* 1988;26(3):423-8.
19. Okafor Okafor CO, Okafor CI, Okpala OC, Umeh E. The pattern of hysterosalpingographic findings in women being investigated for infertility in Nnewi, Nigeria. *Niger J Clin Pract* 2010;13(3): 264-7.
20. Daniel A, Yewebdar N. Evaluation of the fallopian tubes in infertile women by hysterosalpingography in Tikur Anibessa Hospital, Addis Ababa, Ethiopia. *Int J Nurs Midwifery* 2011;3:178-81.DOI:10.5897/IJNM11.039.

21. Sinwat S, Pattamadilok J, Seejorn K. Tubal abnormalities in Thailand infertile females. *J Med Assoc Thai.*2005;88(6):723-7.
22. Adetiloye V. Hysterosalpingography in investigation of infertility: experience with 248 patients. *West Afr J Med.*1992;12(4):191-6
23. Bukar M, Mustapha Z, Takai UI, Tahir A. Hysterosalpingographic findings in infertile women: A seven year review. *Niger J Clin Pract* 2011; 14:168-70. DOI: 10.4103/1119-3077.84008.
24. Akinola RA, Akintola OI, Fabamwo AO. Pattern of genital tract abnormalities on hysterosalpingography in infertile patients in Ikeja, Nigeria. *Niger Postgrad Med J* 2009;16(1):31-4.
25. Mgbor SO. Pattern of hysterosalpingographic findings in gynaecological patients in Enugu. *Niger Med J* 2006;47:14-6.
26. Akagbue VN, Nonye-Enyidah EI, Aderibigbe GJ Hysterosalpingographic Indications and Findings among Women Presenting to Radiology Department of Rivers State University Teaching Hospital. *J Adv Med Pharma Sci* 2022;24(9):14-24. DOI:10.9734/jamps/2022/v24i9576.
27. Makwe CC, Ugwu AO, Sunmonu OH, Yesuf-Awesu SA, Ani-Ugwu NK, Olumakinwa OE. Hysterosalpingography findings of female partners of infertile couple attending fertility clinic at Lagos University Teaching Hospital. *Pan Afr Med J.*2021;40;223. DOI:10.11604/pamj.2021.40.223.29890.
28. Philips CH, Benson CB, Ginsburg ES, Frates MC. Comparison of uterine and tubal pathology identified by Transvaginal sonography, Hysterosalpingography, and hysteroscopy in female patients with infertility. *Fertil Res Pract.* 2015; 1(1):1-6. DOI:10.1186/s40738-015-0012-3
29. Imo AO, Sunday-Adeoye I. Radiological assessment of the uterus and fallopian tubes in infertile women at Abakaliki, Nigeria. *Niger J Clin Pract* 2008;11(3):211-51.
30. Olotu EJ, Osunwoke EA, Ugboma HA, Odu KN. Age prevalence of uterine fibroids in South-Southern Nigeria: a retrospective study. *Sci Res Essay* 2008;3(9):457-9.

31. Baird DD, Dunson DB, Hill MC, Cousins D, Schectman JM. High cumulative incidence of uterine leiomyoma in black and white women: ultrasound evidence. *Am J Obstet Gynecol* 2003;188(1):100-7.

DOI:10.1067/mob.2003.99

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