

Mapping of utero-tubal anomalies by hysterosalpingography at the Centre Médical La Cathédrale (Yaounde, Cameroon): a study of 200 cases

TAYO NGUETSA Marcellin Girez^{1&2*}, NGOKA T. Franck², MBALLA A. Jean Claude^{2&3} & ABANG Elizabeth BI MAONDO⁴

^{*1}Department Of Radiology and Medical Imaging Green Hope University

²Centre Médical La Cathédrale

³Faculty of Sciences-University of Ebolowa

⁴University of Douala

Corresponding Author: TAYO NGUETSA Marcellin Girez

Department of Radiology and Medical Imaging, Green Hope University of Somalia and Centre Médical La Cathédrale

Email: tmng1989@gmail.com

Article History

Received: 13/08/2026

Accepted: 11/09/2026

Published: 24/09/2026

Abstract:

Objectives: An overview of hysterosalpingography practice and the mapping of utero-tubal anomalies at the Centre Médical La Cathédrale.

Methods: This is a descriptive, cross-sectional observational study using a mixed (prospective and retrospective) data collection method. Data collection extended from January 2023 to September 2026. Prospective data were collected using a questionnaire, while retrospective data were extracted from clinical records and radiological reports archived in the RIS/PACS system of the Centre Médical La Cathédrale. A total of 200 hysterosalpingographies (HSG) performed during this period were included, representing 1.32% of all X-ray examinations conducted. The variables studied included patient age, clinical indications, the technical protocol for performing the HSG, and the radiographic abnormalities detected. Data processing and statistical analysis were performed using Epi Info software.

Results: The mean age of the patients was 33.8 years. The primary indication was tubal patency assessment (65.0%), followed by primary infertility (21.5%) and secondary infertility (8.0%). Other indications included metrorrhagia (2.0%), recurrent miscarriages (1.0%), as well as pelvic pain, menorrhagia, suspected synechiae, hydrosalpinx monitoring, and post-operative follow-up, each accounting for 0.5%. Obstetrician-gynecologists were the main referring physicians for the examination. The contrast medium used was a water-soluble iodinated compound, administered at an average volume of 20 ml. The adverse event rate was 11.5%, consisting exclusively of pelvic pain. Psychological support was optimal, and prophylactic antispasmodic administration was systematic (100.0%) prior to the examination. Overall, 67.5% of the HSGs showed at least one lesion. Of the 205 detected anomalies, tubal findings predominated (62.0%), while utero-pelvic abnormalities constituted 38.0% of the lesion workload.

Conclusion: Hysterosalpingography is a specialized imaging examination primarily used for utero-tubal exploration at the Centre Médical La Cathédrale, revealing a lesion profile identical to data in the African literature. Pain remains the main adverse effect..

Keywords: Hysterosalpingography, Female Infertility, Tubal Obstruction, Medical Imaging, Centre Médical La Cathédrale, Sub-saharan Africa.

How to Cite: TAYO NGUETSA, M. G., NGOKA, T. F., MBALLA, A. J. C. & ABANG, E. B. M. (2026). Mapping of utero-tubal anomalies by hysterosalpingography at the Centre Médical La Cathédrale (Yaounde, Cameroon): a study of 200 cases. *IRASS Journal of Applied Medical and Pharmaceutical Sciences*, 3(9), 5-11.

Introduction

Gynecological disorders have multiple etiologies and manifest through varied clinical pictures. In the face of this diversity, medical imaging is essential to complement clinical data, which are often scarce or lacking. Radiography of the utero-tubal cavities, commonly called hysterosalpingography (HSG), is based on the intracavitary injection of a radiopaque contrast medium. This examination remains a diagnostic tool of first choice, especially for utero-tubal exploration (Sanogo, 2006). In current practice, HSG allows for successive visualization of the endocervical canal, the isthmus, the uterine cavity, and the patency

of the fallopian tubes using sequential X-ray images (Neossi et al., 2014). The indications for this examination are broad and primarily include the assessment of couple infertility, the exploration of recurrent pelvic infections, unexplained breakthrough bleeding, recurrent or late miscarriages, chronic pelvic pain, as well as the characterization of intrauterine abnormalities suspected on ultrasound (Neossi et al., 2014). On a global scale, these conditions constitute a major public health problem (Lansac et al., 1999). According to the World Health Organization (WHO), infertility affects an estimated 48 million couples and 186 million individuals worldwide. The prevalence of this disorder varies considerably

from one region to another: among women of childbearing age, it rises to 31% in developed countries, 34% in Asia, 25% in Latin America, and peaks at 37% in Africa. In sub-Saharan Africa, epidemiological data highlight a specific burden linked to secondary infertility. It affects 11.7% of women aged 20 to 44 years, compared to an international average of 10.5% (Balde et al., 2025). The constant increase in sexually transmitted infections (STIs) and their adhesional or tubal sequelae explains a large part of this high incidence. Although it is the non-invasive method best suited for tubal exploration and is systematically prescribed for this purpose (White et al., 1992), HSG is not free of risks or significant side effects for patients. While this imaging modality has been the subject of numerous publications worldwide, local data require updating. It is in this context that our study was conducted, aiming to provide an overview of the practice and results of HSG at the Centre Médical La Cathédrale in Yaoundé (Cameroon), in the face of a growing clinical demand. To achieve this, the following parameters were analyzed: indications for the examination, patient age profile, specific technical features, and the nature of the radiographic abnormalities detected.

Materials and Methods

This was a descriptive, cross-sectional observational study using a mixed (retrospective and prospective) data collection method. It was conducted in the Department of Radiology and Medical Imaging at the Centre Médical La Cathédrale (CMC) in Yaoundé (Mfoundi Division, Centre Region, Cameroon). This department is equipped with a remote-controlled conventional radiology table with fluoroscopy, coupled with a digital scanning system, alongside other standard medical imaging modalities. Data collection extended over a 45-month period, from January 2023 to September 2026. The study population consisted of all patients who underwent a hysterosalpingogram (HSG) at the CMC during the inclusion period. All women with complete and usable radiological records were included in the study. Data were collected using a standardized collection sheet through two modalities:

- Retrospective phase: Data extraction was performed from clinical records and radiological reports archived in the hospital's Radiological Information System (RIS) and Picture Archiving and Communication System (PACS).
- Prospective phase: The execution of the examinations was directly monitored. This phase allowed for the direct observation and interviewing of both practitioners and patients regarding the technical execution of the examination, pain management strategies, and immediately observed adverse effects.

The variables studied included patient age, clinical indications, the technical protocol of the HSG, and the radiographic abnormalities detected. All information was collected, processed, and analyzed in strict compliance with patient anonymity and confidentiality, in accordance with the principles of the Declaration of Helsinki. Data processing and statistical analysis were performed using Epi Info software. Qualitative variables were expressed as frequencies and percentages, while quantitative variables were presented as means with their standard deviations (or medians).

Results

Characteristics of patients

During the study period, hysterosalpingography (HSG) procedures involved 200 patients, representing a prevalence of 1.32% among the 15,180 total radiological examinations.

The analysis of the age distribution reveals a profile concentrated on women in their peak reproductive years, with a mean age of 33.8 years (± 4.5 years) and extremes ranging from 21 to 51 years. The median age fell within the 33–37 years range. The most represented age group was 28–32 years, accounting for 64 patients (32.0%), followed closely by the 33–37 years range, which included 50 patients (25.0%). In total, more than 81% of the overall study population was concentrated between 23 and 43 years of age ($n = 162$), a characteristic typical of populations undergoing hysterosalpingography for pelvic pathology or infertility.

Table 1: age Distribution in the study population (N=200)

Age Group (Years)	Frequency (n)	Percentage (%)
< 23	1	0.5
23–27	27	13.5
28–32	64	32.0
33–37	50	25.0
38–43	49	24.5
44–48	8	4.0
> 48	1	0.5
Total	200	100.0

Note. N = total sample size; n = frequency per age category.

Indications of the HSG

The analysis of the clinical indications for hysterosalpingography shows a clear dominance of tubal patency assessment, which alone accounted for 130 patients, or 65.0% of the overall study population. Fertility disorders represented the second major reason for consultation, divided into primary

infertility for 43 patients (21.5%) and secondary infertility for 16 patients (8.0%). Together, these three reproductive and tubal indications comprised 94.5% of the cases in our cohort. Other motives included vaginal bleeding (2.0%, $n = 4$), recurrent miscarriages (1.0%, $n = 2$), as well as pelvic pain, menorrhagia, suspected synechiae, hydrosalpinx monitoring, and post-operative follow-up, each accounting for a single case (0.5%, $n = 1$).

Table 2: Distribution Indications for Hysterosalpingography in the Study Population ($N = 200$)

Clinical Indication	Frequency (n)	Percentage (%)
Tubal patency assessment	130	65.0
Primary infertility	43	21.5
Secondary infertility	16	8.0
Metrorrhagia	4	2.0
Recurrent miscarriages	2	1.0
Pelvic pain	1	0.5
Hydrosalpinx monitoring	1	0.5
Post-operative follow-up	1	0.5
Suspected synechiae	1	0.5
Menorrhagia	1	0.5
Total	200	100.0

Note. N = total sample size; n = frequency per indication category.

Requesting Specialties

The analysis of the referring physicians' profile shows a clear dominance of obstetrician-gynecologists, who accounted for 95.0% ($n = 190$) of the examination requests. General practitioners and other specialists (including urologists and surgeons) each represented 2.5% of the total, with 5 requests per category.

Technical Aspects

The contrast

The contrast medium used was Xenetix® 300 or diluted Xenetix® 350. The administered volume ranged from 10 ml to 40 ml, with 20 ml being the most frequently used quantity.

Adverse Reactions During the Examination

In terms of clinical tolerance, the majority of patients (88.5%, $n = 177$) experienced no adverse effects related to the procedure or the injection of the contrast medium. Minor side effects were reported in 11.5% ($n = 23$) of patients, consisting exclusively of pelvic pain occurring during and immediately after the examination.

Number of Exposures per Patient

Regarding the radiographic acquisition protocol, a standard series of six views was performed in 135 patients (67.5%). Obtaining complementary or delayed views required seven views

for 35 patients (17.5%) and eight views for 30 patients (15.0%). Image acquisition systematically included an initial plain abdominal radiograph (scout view), followed by frontal pelvic views during early repletion, full repletion, and a lateral view during full repletion. Early and delayed post-evacuation views were also systematically performed for all patients.

Pain Management Methods

Our study demonstrates that after direct observation of clinical cases and clinician interviews, optimal communication was consistently maintained between the practitioner and the patients before, during, and after the examination. This relational approach significantly reduced patient anxiety. Furthermore, speculum insertion and cervical catheterization were performed with great care, accompanied by continuous verbal reassurance aimed at establishing a climate of trust. The injection rate of the iodinated contrast medium (ICM) was deliberately slowed and carefully controlled. Pharmacologically, all patients in our cohort (200/200, 100.0%) received a pre-procedural intramuscular injection of phloroglucinol to prevent and reduce the intensity of induced pain. Post-procedure, patients were observed in the waiting room for at least 30 minutes before discharge. In cases where pain persisted beyond this period, patients were immediately referred back to their attending gynecologist for tailored management. In summary, pain management was found to be optimal throughout the pre-, intra-, and post-procedural phases.

Pathological Profile

Of the 200 hysterosalpingographies (HSG) performed, 67.5% (n = 135) presented a pathological profile, while 32.5% (n = 65) were normal (Figure 1D). The observed abnormalities primarily consisted of tubal obstruction, suspected uterine myomas, pelvic adhesional syndromes, hydrosalpinx, and tubal phimosis (Table 3).

In total, 205 anomalies were identified across the 200 included examinations, highlighting multiple concurrent lesions in several patients. Tubal abnormalities accounted for the majority of the findings, representing 62.0% of the total recorded anomalies (n = 127). These were predominantly dominated by tubal obstruction (43.9% of the total; n = 90). Regarding laterality, these

obstructions were evenly distributed between bilateral and unilateral forms. Topographically, the obstruction was proximal in 52.2% of cases (n = 47), distal in 37.8% of cases (n = 34), and was not specified in the radiological reports for 10.0% of them (n = 9). The remainder of the tubal findings included hydrosalpinx (8.3%; n = 17), comprising 14 unilateral and 3 bilateral forms (Figure 1B), tubal phimosis (5.4%; n = 11), pelvic inflammatory disease sequelae (2.9%; n = 6), and suspected tubal endometriosis (1.5%; n = 3). Uterine and pelvic abnormalities constituted 38.0% of the identified lesions (n = 78). These included pelvic adhesional syndromes (17.1%; n = 35), suspected uterine myomas (14.1%; n = 29), suspected adenomyosis (3.9%; n = 8), and uterine synechiae (2.9%; n = 6) (Figure 1C).

Table 3: Distribution of Diagnosed Abnormalities and Pathologies on Hysterosalpingography (Total Number of Lesions, N = 205)

Anatomical Category and Abnormality	Frequency (n)	Percentage (%)
Tubal Abnormalities	127	62.0
Tubal obstruction	90	43.9
Hydrosalpinx	17	8.3
Tubal phimosis	11	5.4
Pelvic inflammatory disease sequelae	6	2.9
Suspected tubal endometriosis	3	1.5
Uterine and Pelvic Abnormalities	78	38.0
Pelvic adhesional syndromes	35	17.1
Suspected uterine myomas	29	14.1
Suspected adenomyosis	8	3.9
Uterine synechiae	6	2.9
Total Identified Lesions	205	100.0

Note. N = total number of detected abnormalities; n = frequency per lesion category. Subcategories are indented below their respective main anatomical headings



Figure 1: A – Proximal right tubal obstruction and moderate left hydrosalpinx; B – Right hydrosalpinx; C – Uterine synechiae; D – Normal HSG.

Discussion

Prevalence

During the study period, hysterosalpingography (HSG) accounted for 1.32% of the 15,180 total radiological examinations performed within the department. Although this overall proportion may seem modest, HSG stands out as the most frequently performed specialized imaging examination in our series. This high concentration is consistently observed in the majority of medical imaging departments across sub-Saharan Africa, corroborating the findings of Sanogo (2006). Such prevalence highlights the pivotal role and importance of this examination in the diagnostic workup and management of gynecological disorders in the African context.

Age Distribution and Population Profile

Analysis of the age distribution within our study population reveals a profile concentrated on women in their peak reproductive years, with a mean age of 33.8 years (± 4.5 years). The most represented age group was 28–32 years, comprising 64 patients (32.0%), followed closely by the 33–37 years range, which included 50 patients (25.0%). In total, more than 81% of the overall study population was concentrated between 23 and 43 years of age. This demographic targeting matches the characteristics of populations undergoing hysterosalpingography for pelvic pathology or infertility in the literature, including the work of Dakena et al. (1993). Our results also align closely with those reported by Neossi et al. (2014), confirming the consistency of the age window in requests for utero-uterine examinations.

Clinical Indications and the Role of Hysterosalpingography in Infertility

Analysis of the clinical indications for HSG highlights a clear preponderance of reproductive assessments, which accounted for 94.5% of the patients in our cohort. Tubal patency evaluation was the primary reason for consultation, representing 65.0% of cases. Fertility disorders were the second major indication, divided into primary infertility for 43 patients (21.5%) and secondary infertility for 16 patients (8.0%). These proportions are in line with

data reported by Neossi et al. (2014), confirming that infertility and its related workups remain the main drivers of requests for utero-tubal imaging.

These observations reinforce that HSG retains a first-choice position in the exploration algorithm of the female reproductive system for marital infertility. This examination provides the dual benefit of simultaneously assessing tubal patency and the integrity of the uterine cavity, aligning with the conclusions of Belén Ú et al. (2001). Conversely, although pelvic ultrasound is non-invasive and widely available, it often provides limited diagnostic orientation and is insufficient for a complete functional and anatomical assessment of the tubal pathway during infertility workups (Lansac, 1999). Therefore, technical mastery of HSG and rigorous interpretation remain essential for the clinician.

Extrinsic Indications to Infertility

Beyond infertility workups, HSG is contributory in other clinical contexts, including metrorrhagia, recurrent miscarriages, chronic pelvic pain, menorrhagia, suspected uterine synechiae, hydrosalpinx monitoring, and post-operative follow-up. As previously pointed out by Antoine et al. (1992), this technique retains all its relevance in the evaluation of menometrorrhagia, particularly when suspecting uterine adenomyosis or documenting pelvic pain syndromes related to endometriosis. Although supplanted in some indications by hysteroscopy or magnetic resonance imaging (MRI), HSG remains an accessible and high-performing alternative in our clinical environment.

Profile of Referring Physicians

Analysis of the referring physicians' profile highlights an almost exclusive dominance of obstetrician-gynecologists, who initiated 95.0% of HSG requests. Conversely, general practitioners and clinicians from other specialties represented only a marginal share of 2.5% each, equivalent to 5 examinations per category, which aligns with data reported by Neossi et al. (2014). This marked preponderance of obstetrician-gynecologists is explained by the fact that marital infertility and complex utero-adnexal

pathologies fall under specialized management. Because hysterosalpingography is an uncomfortable and ionizing procedure, its prescription requires careful patient selection, typically integrated into a precise diagnostic algorithm managed by a specialist.

Choice of Contrast Agent and Clinical Tolerance

From a pharmaco-radiological standpoint, the use of a water-soluble, non-ionic, low-osmolality iodinated contrast medium (Xenetix® 300 or 350 mg Iodine/ml) ensured excellent opacification of the utero-tubal cavity. The volume of contrast medium administered varied from 10 mL to 40 mL depending on the anatomical features of each patient, with a predominant modal value of 20 mL, which corresponds to the standard volumes required for optimal repletion. This approach greatly contributed to the highly satisfactory clinical safety profile observed in our cohort, where a large majority of patients (88.5%) experienced no major systemic or local adverse effects.

Adverse events categorized as minor were identified in 11.5% of patients. These consisted exclusively of transient pelvic pain occurring during injection or immediately after the procedure. The total absence of allergic reactions or immediate infectious complications confirms the safety of the molecule used and highlights strict compliance with aseptic rules, as well as the efficacy of the analgesic premedication protocol previously described.

Iconographic Protocol and Chronological Scheduling of the Examination

Analysis of the radiographic acquisition modalities reveals rigorous standardization of the procedure, guided by the need for exhaustive morphological and dynamic exploration. A standard series of six views was sufficient to establish a diagnosis in 67.5% of patients. However, the complexity of certain anatomical presentations or the need to resolve doubts regarding filling defects or additive images justified the use of complementary or delayed views, requiring seven views for 17.5% of patients and eight views for 15.0% of them. The systematic iconographic structure included an initial plain pelvic radiograph (scout view), followed by pelvic views centered during different filling phases: frontal early repletion, frontal full repletion, and a lateral view during full repletion. Early and delayed post-evacuation views systematically completed the protocol for the entire cohort. This aligns faithfully with accepted technical recommendations and African reference protocols, such as the one described by Neossi et al. (2014).

Finally, regarding radiation safety, the chronological scheduling of the examination was rigorously framed. The examination was systematically scheduled during the week following the first day of the menstrual cycle (early follicular phase). This early timeline meets a crucial dual objective: first, it formally rules out the risk of irradiating an unknown early pregnancy; second, it takes advantage of a thin endometrium, which promotes optimal image quality while preventing vascular reflux of the contrast medium, in accordance with radiological requirements recalled by Neossi et al. (2014).

Pain management and preparation for the examination

Performing a hysterosalpingogram (HSG) is known to be associated with discomfort and physical pain, which must be optimized to ensure image quality and patient compliance. In our

series, the care strategy relied on a dual approach combining psychological support and pharmacological preparation. On the psychological level, the intervention of radiographers and radiological technologists proved essential to reassure patients and reduce their anxiety. As pointed out by Agoda-Koussema et al. (2014) in Togo and Winckler et al. (2010), this phase of trust-building and empathy is a necessary prerequisite to defuse procedural apprehension, while also obtaining informed consent and active cooperation. The technical staff effectively serves as the pivot for information, comfort, and support throughout the procedure.

Pharmacologically, antispasmodic drugs were the cornerstone of analgesic support, being systematically prescribed and administered in 100.0% of cases in our cohort. This systematic approach aligns with local practices reported by Mbo Amvene et al. (2016) in Cameroon, who highlighted antispasmodic use in 82.85% of cases. The clinical justification for this almost universal requirement is based on well-documented pathophysiological mechanisms. Indeed, the work of Rouanet et al. (2011), N'Gbesso et al. (2003) in Côte d'Ivoire, and Mvondo Abeng (2000) in Cameroon demonstrated that the painful component of HSG is largely dominated by tubal and myometrial spasms caused by the distension of the uterine cavity during contrast medium injection. Administering antispasmodic drugs directly targets this mechanism, leading to rapid attenuation of painful symptoms while limiting false-positive aspects of tubal obstruction related to ostial spasms.

Comprehensive Comparative Analysis

The overall analysis of our series reveals a pathological examination rate of 67.5% versus 32.5% of normal explorations. In a similar work evaluating the same parameters in Cameroon, Neossi et al. (2014) reported a significantly higher prevalence of abnormalities, reaching 89.47% of cases with only 10.53% of normal examinations. This divergence highlights significant variations in local epidemiology. It is mainly explained by differences in patient selection criteria, healthcare utilization levels, and the severity or duration of infertility at the time of consultation. In our context, earlier detection or broader inclusion criteria for primary infertility workups could justify this higher proportion of normal examinations.

Lesional Typology and Preponderance of Tubal Pathology

Despite this disparity, the overall pattern of identified lesions shows remarkable homogeneity with the African literature. A total of 205 abnormalities were identified across the 200 included examinations, confirming the frequency of complex concurrent lesions in a single patient (2 to 4 coexisting pathologies). Tubal abnormalities were the predominant contingent, representing 62.0% of all findings. This group was heavily dominated by tubal obstruction, which was equally distributed between unilateral and bilateral forms, affecting either the proximal or distal segments. The remainder of the tubal findings included hydrosalpinx (8.3%), tubal phimosis (5.4%), pelvic inflammatory disease sequelae (2.9%), and suspected tubal endometriosis (1.5%). This high prevalence of adnexal lesions corroborates the findings of Neossi et al. (2014) and is pathophysiologically explained by the resurgence of poorly treated sexually transmitted infections (STIs) and upper genital tract infections, which remain the major causative factors for tubal damage in sub-Saharan Africa.

Utero-Pelvic Findings and Pathophysiological Consistency

Concurrently, uterine and pelvic abnormalities accounted for 38.0% of the overall number of lesions. They included pelvic adhesional syndromes (17.1%), suspected uterine myomas (14.1%), suspected adenomyosis (3.9%), and uterine synechiae (2.9%). These proportions closely align with the lesion profile described by Neossi et al. (2014). The convergence of these data confirms the excellent reproducibility of hysterosalpingography in identifying utero-tubal pathologies. The primary variation lies not in the nature of the lesions, but in their degree of clinical expression and quantitative prevalence within cohorts.

Conclusion

In the absence of direct access to hysteroscopy and laparoscopy in our facility, hysterosalpingography (HSG) remains the specialized, first-line radiological examination for the exploration of female infertility. Its high diagnostic yield validates the initial clinical guidelines of referring physicians. The pathologies identified in our series of 200 cases are predominantly tubal (obstruction, hydrosalpinx) and uterine/pelvic (suspected myomas, synechiae, and adhesional syndromes). On a technical level, our study highlights the importance of multimodal pain management. Prior to the examination, dialogue and reassurance establish a climate of mutual trust, thereby reducing patient anxiety. During the procedure, this continuous psychological support is effectively supplemented by the slow injection of the iodinated contrast medium and the administration of phloroglucinol. These findings fully justify the first-line prescription of HSG when infertility is suspected in our environment. Furthermore, they demonstrate that practices at the Centre Médical La Cathédrale comply with current international recommendations, successfully combining diagnostic rigor with the optimization of patient clinical tolerance and pain control.

Conflict of interest

On behalf of all authors the corresponding author declares no conflicts of interest

References

- Agoda-Koussema, L. K., Anoukoum, T., Adigo, A., Adjénou, K., Dagbé, M., Jibril, A. M., Balaka, A., Sonhayé, L., Does not timon, B., Amouzou, K. D., Akpadza, K., & Don Dakena, K. (2014). Pelvic pain induced during the realization of the hysterosalpingography (HSG) in women at the university hospital Campus of Lomé. *African Journal of Medical Imaging*, 1(6), 14-20.
- Antoine, J. M., & Salat-Baroux, J. (1992). Is there a place for hysterosalpingography in 1992? *Contraception, Fertility, Sexuality*, 20(6), 637-639.
- Balde, A. A., Bah, O. A., Diallo, M., Well, A. D., Camara, M., & Agoda-Koussema, L. K. (2025). Contribution of hysterosalpingography in the etiological diagnosis of female infertility in Conakry. *Annals of the SOGGO*, 20(44).
- Belén, Ú., Marta, P., Enric, A., & Ramón, A. A. (2001). Hysterosalpingography spectrum of normal variants and nonpathologic findings. *American Journal of Roentgenology*, 177(1), 131-135.
- Bintou, Z. (1999). *Hysterosalpingography and pathology in utero-adnexal at the centre of the National Hospital Sanou Souro de Bobo Dioulasso (CHNSS) about 408 cases* [Thesis of doctorate in medicine, University of Ouagadougou].
- White, B., Zarka, V., Boubli, L., & Baurant, J. (1992). Contribution of the explorations of the female reproductive system in a balance sheet of sterility. *Contraception, Fertility, Sexuality*, 20(2), 198-204.
- Lansac, J., & Lecomte, P. (1999). *Gynecology for the practitioner* (5th edn, pp. 200-213). Masson.
- Mbo Amvene, J., Hountie, C., Mballa, J. C., Ngaroua, & nko'o Amvene, S. (2016). Management of pain during hysterosalpingography. *Health Sciences and Disease*, 17(1), 41-45.
- Mvondo Abeng, E. (2000). *Value of hysterosalpingography in the evaluation of tubal infertility in Cameroon* [doctoral Thesis in medicine, University of Yaoundé I].
- Neossi Guena, M., Mbo Amvene, J., Moifo, B., Keugoung, B., Diallo, O., nko'o Amvene, S., & Gonsu Fotsin, J. (2014). Practice of hysterosalpingography in the Regional Hospital of Ngaoundéré. *Health Sciences and Disease*, 15(3), 1-5.
- Not Gbesso, R. D., Tan, B., Ould Beddi, M., & Quenum, G. (2003). The practice of antibiotic therapy preventive systematic in the course of hysterosalpingography in tropical africa, is it justified ? *Notebooks for Study and Research Francophones / Health*, 13(1), 23-27.
- Not dakena, K., Adjmagbo, K., & Hodonou, K. (1993). Radiological Aspects of the pathology utero-tubal in female sterility : about 1314 hystérosalpingographies at the university teaching hospital of Lomé. *Medicine of Black Africa*, 40(10), 580-582.
- Rouanet, Says J. P., Mares, P., Dechaud, H., Viala-Trentini, M., & Maubon, A. (2012). Interventional imaging obstructions tubal "proximal" and infertility : Selective tubal catheterization and infertility. *Annals of Surgery*, 11(1), 6-12.
- Sanogo, M. (2006). *Contribution of hysterosalpingography in the diagnosis of gynaecological disorders : about 100 cases in the radiology department of the hospital Gabriel Touré* [doctoral Thesis in medicine, University of Bamako].
- Winckler, M., & Annequin, D. (2010). *The pain made to women*. Éditions du Seuil.