OPEN ACCESS

Orapuh Journal

ORIGINAL ARTICLE

Journal of Oral & Public Health

Epidemiological-Clinical Profile and Magnetic Resonance Imaging (MRI) of Endometriosis in Kinshasa (2022–2023)

Mbambi, F. D.[1], Bukumba, C. M.[1], Tongo, S. Y.[1], Letumu, N. B.[1], Tshienda, F. T.[1], Mazoba, T. K.[1], Boloweti, D. B.[1], Ifinji, R. E.[1], Simanyama, P. L.[1], Aundu, A. M.[1], Mukaya, J. T.[1], & Mvila, G. L.[1,2]

[1]*Imaging and Radiology Department, University of Kinshasa, Kinshasa XI, Democratic Republic of the Congo*
[2]*Interdisciplinary Center for Research in Medical Imaging (CIRIMED), University of Kinshasa, Kinshasa XI, Democratic Republic of the Congo*

ARTICLE INFO

Received: *05 May 2025*
Accepted: *30 May 2025*
Published: *15 July 2025*

Keywords:
Endometriosis, adenomyosis, ovarian endometriosis, chronic pelvic pain, infertility, pelvic MRI, low-resource settings, Kinshasa

Peer-Review: *Externally peer-reviewed*

Correspondence to:
Dr. Gertrude Luyeye Mvila
gluyeye.gl@gmail.com

To cite:
Mbambi, F. D., Bukumba, C. M., Tongo, S. Y., Letumu, N. B., Tshienda, F. T., Mazoba, T. K., Boloweti, D. B., Ifinji, R. E., Simanyama, P. L., Aundu, A. M., Mukaya, J. T., & Mvila, G. L. (2025). Epidemiological-Clinical Profile and Magnetic Resonance Imaging (MRI) of Endometriosis in Kinshasa (2022–2023). *Orapuh Journal, 6*(7), e1264
https://dx.doi.org/10.4314/orapj.v6i7.64

ISSN: *2644-3740*

Published by Orapuh, Inc. (info@orapuh.org)

Editor-in-Chief: Prof. V. E. Adamu
Orapuh, Inc., UMTG PMB 405, Serrekunda, The Gambia, editor@orapuh.org.

ABSTRACT

Introduction

Endometriosis is a chronic, often underdiagnosed gynaecological condition affecting women of reproductive age, with a growing impact on quality of life and fertility worldwide. Despite its prevalence, limited data are available in sub-Saharan African settings, including Kinshasa.

Purpose

To describe the epidemiological, clinical, and MRI features of endometriosis in women undergoing pelvic MRI in Kinshasa between 2022 and 2023.

Methods

A retrospective descriptive cross-sectional study was conducted using records from three MRI centres in Kinshasa. Data were collected from patients with a clinical or ultrasound suspicion of endometriosis and an MRI-confirmed diagnosis. Variables analysed included age, clinical presentation, MRI indications, protocols used, and forms of endometriosis identified.

Results

A total of 83 women were included, with a mean age of 37 ± 9 years. Most patients (58%) were aged between 20 and 40 years. The predominant clinical presentations were chronic pelvic pain and infertility (53%), followed by dysmenorrhoea and menstrual disorders (22%). MRI was most frequently requested for suspected endometriosis (65%). Adenomyosis was the most common form observed (40%), particularly in women over 40, while ovarian endometriosis accounted for 20% of cases. Deep pelvic endometriosis was more frequent in women under 25. Vaginal and rectal opacification with contrast was used in 43% of cases, mostly when performed by general radiologists.

Conclusion

Endometriosis is prevalent among women of reproductive age in Kinshasa, with chronic pelvic pain and infertility as key presenting complaints. MRI remains a valuable diagnostic tool, especially for detecting adenomyosis and ovarian endometriosis. These findings emphasise the importance of improved diagnostic strategies and awareness in low-resource settings.

INTRODUCTION

Endometriosis is a chronic, incurable gynaecological condition histologically defined by the presence of endometrial glands or stroma outside the uterine cavity. It affects approximately one in ten women of reproductive age worldwide, resulting in a substantial impact on quality of life (Borghese et al., 2018; Haute Autorité de Santé [HAS], 2017).

In the Democratic Republic of Congo (DRC), data remain scarce. However, according to Endo-RDC, a non-governmental organisation, an estimated 1.6 million women suffer from endometriosis nationwide, including nearly 300,000 in Kinshasa, as reported during International Endometriosis Day in March 2024 (Endo-RDC, 2024). Despite these alarming figures, awareness among both the general population and healthcare professionals remains low, leading to significant underdiagnosis.

Endometriosis is often asymptomatic or discovered incidentally during assessments for pelvic pain in 25% of cases or infertility in 20% of cases. HAS (2017) describes three main clinical forms: superficial peritoneal, ovarian, and deeply infiltrating pelvic endometriosis (Fauconnier et al., 2018; HAS, 2017).

Magnetic resonance imaging (MRI) is a non-invasive, non-ionising imaging modality that provides excellent lesion mapping and precise diagnosis, particularly for ovarian and deeply infiltrating endometriosis (Aki et al., 2022; Angela et al., 2020; Xiao et al., 2020).

To date, no national-level data on MRI-based characterisation of endometriosis have been published in the DRC. This study therefore aims to fill that gap by describing the MRI and clinical features of endometriosis in affected women in Kinshasa, with the goal of contributing to better diagnosis and management of the disease in this setting.

METHODS

This is a descriptive cross-sectional study covering the period from January 2022 to December 2023. Data were collected from the medical records of patients at three hospital facilities in Kinshasa, equipped with either high-field or low-field MRI machines: HJ Hospitals (Siemens 1.5 Tesla), the Kinshasa Diagnostic Center (GE 0.5 Tesla), and Diamant Medical Center (Hitachi 0.4 Tesla). During this period, a total of 1,236 pelvic MRIs were performed across these three centres, of which 86 were consistent with a diagnosis of endometriosis.

Inclusion criteria

Any patient with a clinical or ultrasound suspicion of endometriosis, whose record included a documented diagnosis of endometriosis confirmed by pelvic MRI (report and images) during the study period.

Exclusion criteria

Any patient who underwent a pelvic MRI during the study period for endometriosis, with an MRI diagnosis of endometriosis, but whose record lacked complete information (age, clinical details).

Non-inclusion criteria

Any patient who underwent a pelvic MRI during the study period for other pathologies or for endometriosis, but where the MRI diagnosis did not confirm endometriosis.

The MRI protocol used incorporated both standard and optional sequences, with or without vaginal and rectal opacification using gel, and with or without contrast agent injection (gadolinium). MRI exams were interpreted using dedicated viewing software (RadiAnt DICOM Viewer), and readings were performed by general radiologists. In each case, the images were reviewed by at least two radiologists, and discrepancies were resolved by consensus; no blinding was applied during the review.

Study variables

The study variables included age, reason for consultation, MRI indication, MRI protocol, and the form or location of endometriosis.

Operational Definitions

Ovarian endometriosis:

Any ovarian mass with high signal intensity on T1, persisting on T1 fat-saturated (T1FS), and showing high signal intensity on T2 shading.

- Depending on size: Endometriomas (≥ 3 cm), endometriotic cysts (1 to 3 cm), endometriotic implants (≤ 1 cm).
- Often bilateral, multilocular, and with variable signal intensities.

https://dx.doi.org/10.4314/orapj.v6i7.64

Superficial or peritoneal endometriosis:
Presence of ectopic endometrial implants with strong hyperintensity on T1FS located on the surface of the pelvic peritoneum, in the vesico-uterine pouch, ovarian fossae, and abdominal wall.

- Variable appearance on T2, hyperintensity on T1FS
- Detection of implants ≥ 4 mm
- Adhesions
- Fine bands with hypointensity on T1/T2

Deep pelvic endometriosis or sub-peritoneal endometriosis:

- Spiculated fibrous nodules or masses: hypointense or isointense on T1 and T2 (+++)
- Nodular thickening
- Mixed forms: fibrous masses with hypointensity containing active foci with hyperintensity on T1 and/or T2 (haemorrhagic)
- Glandular forms: nodules or masses with significant glandular components: hyperintense on T2 and T1
- Typical locations:
    i. Posterior: uterosacral ligaments, torus uterinum, fornix, recto-vaginal septum
    ii. Anterior: vesico-uterine pouch, bladder wall, pre-vesical space, bladder, and ureters
    iii. Beyond the pelvis: sigmoid colon, right colon, appendix, and terminal ileum

Adenomyosis:
Diffuse or focal thickening (adenomyoma) of the junctional zone (inner myometrium) with hypointensity on T2, typically beyond 12 mm.

- Often contains small haemorrhagic foci with hyperintensity on T1 and/or glandular cystic foci with hyperintensity on T2

MRI sequences (protocol):

- Mandatory sequences: sagittal T2, axial T2, axial T2 through the uterosacral ligament plane, axial T1, and T1 after fat suppression
- Optional sequences (commonly used for atypical adnexal endometriosis): diffusion sequence, 3D T2 TSE-weighted, 3D T1 TSE-weighted, sagittal T2 HASTE fat sat, coronal STIR, 3D T1 VIBE fat sat, coronal T1 inversion-recovery

Statistical Analysis

The data from this study were organised into an Excel table and analysed using R software. The age of the patients was summarised by mean and standard deviation. Categorical variables were summarised as proportions. The comparison of proportions by age group was performed using Fisher's exact test.

RESULTS

A total of 83 patients underwent pelvic MRI with a diagnosis of endometriosis. The majority were examined at HJ Hospitals in Limete (78%), followed by Diamant Medical Center in Ngaliema (13%) and Kinshasa Diagnostic Center (9%).

The mean age of the study population was 37 ± 9 years, ranging from 22 to 68 years. Most patients (58%) were between 20 and 40 years old, while 35% were over 40.

The most common clinical presentations were chronic pelvic pain and infertility (53%), followed by dysmenorrhea and menstrual disorders (22%). Chronic pelvic pain was particularly prevalent in patients under 25 years of age (67%). In the 25–40 age group, chronic pelvic pain, dysmenorrhea, and infertility were frequently reported. In patients over 40, these symptoms were often accompanied by hypogastric or pelvic masses.

MRI was primarily performed for suspected endometriosis (65%), ovarian mass evaluation (11%), assessment of menstrual disorders (10%), and infertility investigation (7%).

Prior pelvic ultrasound had been performed in 61% of patients. The most common ultrasound findings were suspected endometriosis (42%) and ovarian cysts (10%).

MRI Findings

Adenomyosis was the most frequent MRI finding, present in 40% of cases overall, and in 66% of patients over 40 years. Ovarian endometriosis was observed in 20% of cases, most commonly in the 25–40 age group (29%). Deep infiltrating endometriosis was more prevalent in patients under 25 years of age.

Multiple lesions were found in 23% of patients. The most frequent combination was adenomyosis with ovarian endometriosis (12%), followed by adenomyosis with deep infiltrating endometriosis (6%).

MRI protocols varied by imaging centre. In 43% of cases, vaginal and/or rectal gel opacification was combined with gadolinium contrast injection. In 23% of cases, gel was used without contrast. The remaining examinations were performed without contrast or gel.

Lesion distribution patterns across age groups revealed that adenomyosis increased with age, while deep endometriosis was more common in younger patients (HAS, 2017; Fauconnier et al., 2018; Aki et al., 2022).

Table 1:
Clinical Presentations by Age Group *(N = 83)*

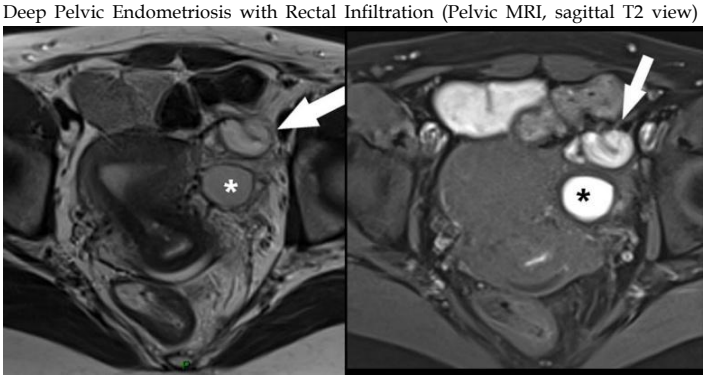
Clinical Presentation	Overall *n (%)*	< 25 yrs *(n = 6)*	25–40 yrs *(n = 48)*	> 40 yrs *(n = 29)*	p-value[1]
Chronic pelvic pain	24 (28.9%)	4 (66.7%)	13 (27.1%)	7 (24.1%)	0.80
Chronic pain + infertility	4 (4.8%)	0 (0%)	3 (6.3%)	1 (3.4%)	
Infertility	20 (24.1%)	1 (16.7%)	14 (29.2%)	5 (17.2%)	
Dysmenorrhea (after surgery)	3 (3.6%)	0 (0%)	2 (4.2%)	1 (3.4%)	
Dysmenorrhea + infertility	3 (3.6%)	0 (0%)	2 (4.2%)	1 (3.4%)	
Dysmenorrhea	12 (14.5%)	0 (0%)	7 (14.6%)	5 (17.2%)	
Hypogastric mass	4 (4.8%)	0 (0%)	1 (2.1%)	3 (10.3%)	
Pelvic mass	5 (6.0%)	0 (0%)	4 (8.3%)	1 (3.4%)	
Umbilical bleeding during menstruation	1 (1.2%)	0 (0%)	1 (2.1%)	0 (0%)	
Menstrual disorders	7 (8.4%)	0 (0%)	2 (4.2%)	5 (17.2%)	

Table 2:
MRI Findings by Age Group *(N = 83)*

MRI Diagnosis	Overall *n (%)*	< 25 yrs *(n = 6)*	25–40 yrs *(n = 48)*	> 40 yrs *(n = 29)*
Adenomyosis	33 (39.8%)	1 (16.7%)	13 (27.1%)	19 (65.5%)
with bilateral ovarian endometriosis	5 (6.0%)	0 (0%)	4 (8.3%)	1 (3.4%)
with right ovarian endometriosis	5 (6.0%)	0 (0%)	3 (6.3%)	2 (6.9%)
with left ovarian endometriosis	4 (4.8%)	0 (0%)	1 (2.1%)	3 (10.3%)
with deep ovarian endometriosis	6 (7.2%)	1 (17.0%)	5 (10.4%)	0 (0%)
with isolated deep endometriosis	1 (1.2%)	0 (0%)	0 (0%)	1 (3.4%)
with uterine myomatosis	4 (4.8%)	0 (0%)	3 (6.3%)	1 (3.4%)
Ovarian endometriosis	17 (20.5%)	0 (0%)	12 (25.0%)	5 (17.2%)
with deep ovarian endometriosis	2 (2.4%)	1 (17.0%)	1 (2.1%)	0 (0%)
Isolated deep endometriosis *(non-ovarian)*	6 (7.2%)	2 (33.3%)	4 (8.3%)	0 (0%)

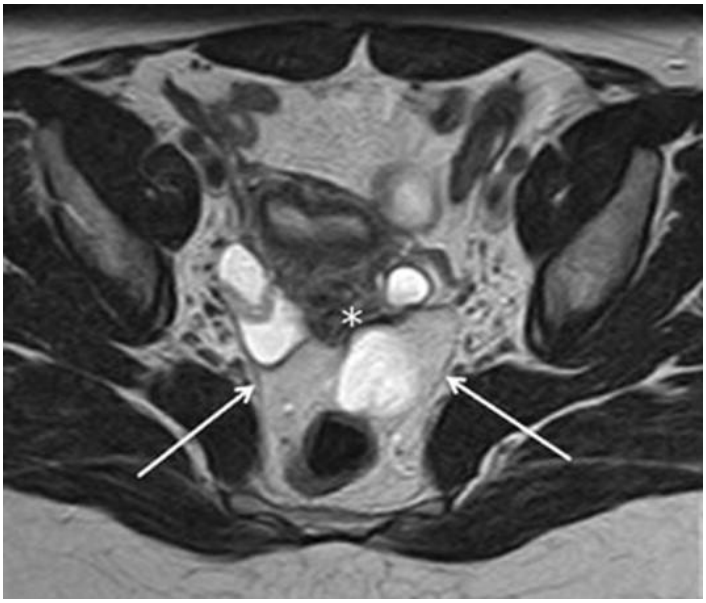
Representative MRI Illustrations of the Main Forms of Endometriosis

Figure 1:
Deep Pelvic Endometriosis with Rectal Infiltration (Pelvic MRI, sagittal T2 view)



This image **(Figure 1)** shows a deep pelvic endometriosis lesion infiltrating the anterior wall of the rectum. An irregular, T2 hypointense thickening is observed, continuous with the uterine torus, forming a characteristic "fan-like" appearance. This presentation is typical of deep retrocervical involvement, often responsible for dyschezia, deep dyspareunia, and chronic pelvic pain. MRI allows for excellent evaluation of parietal extension and surgical planning (Rasuli, 2025).

Figure 2:
Right Ovarian Endometrioma with Shading Effect (Pelvic MRI, T1 and T2 sequences)



This image **(Figure 2)** displays an ovarian cyst with homogeneous hyperintense content on T1 sequences, showing "shading" (signal attenuation) on T2—a characteristic sign of an endometrioma. This signal

https://dx.doi.org/10.4314/orapj.v6i7.64

indicates the presence of old blood within the cyst. An endometrioma is a common form of ovarian endometriosis, often associated with fertility issues. Identifying "shading" on T2 is a major diagnostic criterion, helping to differentiate an endometrioma from other cystic ovarian masses (Rasuli, 2025).

DISCUSSION

The mean age of our patients was 37 ± 9 years, ranging from 22 to 68 years. This result is similar to a study by Kuzoma (2022) at CHU Lariboisière in France, which reported a mean age of 34.2 ± 8.2 years, as well as several African studies, including those by Bilkissou et al. (2023) in Cameroon, Mashele et al. (2020) in South Africa, Mboudou et al. (2008) in Yaoundé, and Amat et al. (2020) in Senegal, who found mean ages of 34.65 ± 6.7 years, 34.5 ± 8 years, 31.5 years, and 39.5 years, respectively.

The majority of cases (58%) were observed in women aged between 20 and 40 years, compared to 7% in women under 25 years and 29% in women over 40 years. These findings are consistent with a public health study conducted in France between 2011 and 2017, which found 68% of cases in women aged 25–49 years, 4% in women under 25 years, and 27.8% in women aged 50 years and older (Le Moal Joëlle et al., 2022).

The most common indication for MRI was for the assessment of endometriosis, accounting for 65% of cases.

The clinical presentation was dominated by:

- Chronic pelvic pain in 67% of cases in women under 24 years old. This is consistent with literature data, as the World Health Organization (WHO, 2023) and EndoFrance estimate that the prevalence of endometriosis among women with chronic pelvic pain ranges from 2% to 74%, with an annual incidence of 0.1% reported in women aged 15–42 years. Similarly, Kuzoma (2022) reported 63.5% of cases at CHU Lariboisière.
- Chronic pelvic pain and infertility in 53% of cases overall. This supports findings by Linda et al. (2023) in Dakar, who reported a prevalence ranging from 20% to 68%. EndoFrance (2023) estimates that about 30% to 40% of women with endometriosis experience infertility. This discrepancy may be explained by dietary and environmental factors, as well as sampling bias, given that infertile couples are more likely to undergo MRI due to the cultural importance of pregnancy in Africa.

Two-thirds of the patients (61%) had previously undergone ultrasound, with suspected endometriosis identified in 42% of cases. Similar diagnostic performance between transvaginal ultrasound and pelvic MRI has been reported (Fauconnier et al., 2018). In our setting, this may reflect the lack of qualified personnel, variability in ultrasound equipment quality, and limited reporting of the imaging approach, as many reports likely focused on suprapubic views.

Adenomyosis was the most common form identified, found in 40% of cases, followed by ovarian endometriosis in 20% of cases. These findings are consistent with those of Diallo et al. (2020) and Samuel et al. (2022), who reported prevalences of 52.5% and 64%, respectively. In contrast, Bazot et al. (2020) found that ovarian endometriosis was the most common form, followed by adenomyosis.

MRI protocols included both standard and optional sequences, with vaginal and rectal opacification using gel and contrast injection in 43% of cases, and gel without opacification in 23% of cases. According to the French National Authority for Health (HAS, 2017), vaginal and rectal opacification with gel and contrast injection are optional, as standard sequences are sufficient for diagnosing endometriosis. Bazot et al. (2020) noted that this depends on reader experience: for average readers, vaginal and rectal opacification provide additional value, whereas for expert readers, it offers no added benefit. Uyttenhove et al. (2016) concluded that rectal and vaginal filling in endometriosis staging with MRI is unnecessary, regardless of reader experience.

In our setting, the use of these protocols may be justified, as the exams are interpreted by general radiologists rather than specialists in endometriosis. This highlights the critical need for specialised training in gynaecological imaging to improve diagnostic accuracy and consistency.

Limitations

- **Heterogeneity of protocols**: Variability in MRI protocols across centres may have introduced

https://dx.doi.org/10.4314/orapj.v6i7.64

inconsistencies, potentially affecting diagnostic accuracy and comparability.

- **Retrospective nature**: The study's retrospective design limited data completeness and may have introduced bias due to missing clinical information.
- **Low-field MRI machines**: The use of low-field MRI (0.4–0.5 Tesla) may have reduced image quality and diagnostic sensitivity, particularly for subtle forms of endometriosis.
- **Limited accessibility**: Socioeconomic and infrastructural barriers to MRI access may have influenced patient selection and study generalisability.
- **Absence of superficial endometriosis cases**: No cases of superficial endometriosis were identified, possibly due to imaging limitations, equipment constraints, or under-representation in the patient population.

CONCLUSION

Endometriosis is a significant condition affecting women of reproductive age in our setting, with a predominance (58%) among those aged 20–40 years. Chronic pelvic pain and infertility are the main reasons for consultation and key symptoms guiding diagnosis. Adenomyosis is the most frequently observed clinical form, followed by ovarian endometriosis. These findings underscore the need for early and tailored management through high-quality imaging. Standardised MRI protocols and targeted radiologist training are critically needed to enhance diagnosis and care in our context.

Ethical Approval: Nil required.

Conflicts of Interest: None declared.

ORCID iDs:

Mbambi, F. D.[1]: Nil identified
Bukumba, C. M.[1]: Nil identified
Tongo, S. Y.[1]: Nil identified
Letumu, N. B.[1]: Nil identified
Tshienda, F. T.[1]: Nil identified
Mazoba, T. K.[1]: https://orcid.org/0000-0002-9791-6538
Boloweti, D. B.[1]: Nil identified
Ifinji, R. E.[1]: Nil identified
Simanyama, P. L.[1]: Nil identified
Aundu, A. M.[1]: Nil identified
Mukaya, J. T.[1]: Nil identified
Mvila, G. L.[1,2]: https://orcid.org/0009-0000-1475-3642

REFERENCES

Bazot, M., & Daraï, E. (2017). Diagnostic de l'endométriose profonde : Examen clinique, échographie, imagerie par résonance magnétique et autres techniques. *Fertility and Sterility, 108*, 886–894.

Bilkissou, M., Ngaha Yaneu, J., Njalong Opoulou, H., Tatah Neng, H., Kamdem, D., et al. (2023). L'endométriose chez la femme camerounaise vivant à Douala : Aspects cliniques, paracliniques et thérapeutiques. *Health Sciences and Disease, 24*(5), 46–51.

Borghese, B., et al. (2018). Définition, description, formes anatomo-cliniques, pathogenèse et histoire naturelle de l'endométriose. *Gynécologie Obstétrique Fertilité et Sénologie, RPC Endométriose CNGOF-HAS*.

Diallo, M., Niang, F. G., Diop, A. D., Soko, T. O., Fall, A., Diouf, C. T., Mbengue, A., Ndiaye, A., Diop, A. N., & Diakhate, I. (2020). Profil de l'endométriose pelvienne à l'IRM à Dakar – Sénégal. *Journal Africain d'Imagerie Médicale, 13*(3).

Fauconnier, A., Borghese, B., Huchon, C., Thomassin-Naggara, I., Philip, C. A., Gauthier, T., Bourdel, N., Denouel, A., et al. (2018). Epidémiologie et stratégie diagnostique. *Gynécologie Obstétrique Fertilité et Sénologie, 46*, 223–230.

HAS. (2017). *Recommandations de bonne pratique : Prise en charge de l'endométriose*. Haute Autorité de Santé.

Kuzoma, K. F. (2022). *Apport de l'IRM dans la mise au point de l'endométriose pelvienne au CHU Lariboisière en 2017-2028* [Mémoire de fin d'études, Université de Kinshasa].

Le Moal, J., Goria, S., Chesneau, J., Fauconnier, A., Kvaskoff, M., De Crouy-Chanel, P., Kahn, V., Daraï, É., & Canis, M. (2022). Épidémiologie de l'endométriose prise en charge à l'hôpital en France : Étude de 2011 à 2017.

Linda, B., Thiam, I., Senghor, F., Kebe, C. T., Gaye, M., Dieme Ahouidi, M. J., et al. (2023). Aspects épidémiologiques et anatomopathologiques des endométrioses à Dakar : Étude rétrospective sur une

période de 20 ans. *Annales de Pathologie*. https://doi.org/10.1016/j.annpat.2023.10.003

Mashele, T., Reddy, Y., & Pather, S. (2020). Endometriosis: Three-year histopathological perspective from the largest hospital in Africa. *Annals of Diagnostic Pathology, 45*, 151458.

Mboudou, E. T., Priso, E. B., Mayer, F. E., Minkande, J. Z., Foumane, P., & Doh, A. S. (2007). Prévalence de l'endométriose en laparoscopie chez les femmes infertiles à Yaoundé, Cameroun. *Clinical Mother and Child Health, 4*(2).

OMS. (2023, mars). *Informations sur l'endométriose*. Organisation mondiale de la Santé.

Rasuli, B. (2005). Deep pelvic endometriosis (MRI). Case study, *Radiopaedia.org* (Accessed on 25 May 2025) https://doi.org/10.53347/rID-203406

Samuel, O., & Onyishi, N. (2022). Endométriose chez une population de femmes autochtones africaines. *African Health Sciences, 22*(1), 133–138.

Tong, A., VanBuren, W. M., Chamié, L., et al. (2020). Recommandations pour la technique d'IRM dans l'évaluation de l'endométriose pelvienne : Déclaration de consensus du panel axé sur la maladie de l'endométriose de la Société de Radiologie Abdominale. *Abdominal Radiology, 45*(6), 1569–1586.

Uyttenhove, F., Langlois, C., Collinet, P., Rubod, C., & Verpillat, P. (2016). Endométriose infiltrante profonde : Faut-il systématiquement utiliser l'opacification rectale et vaginale en IRM? *Gynécologie Obstétrique Fertilité, 44*(6), 322–328.

Xiao, Z., He, T., & Shen, W. (2020). Comparaison de l'examen physique, des techniques d'échographie et de l'imagerie par résonance magnétique pour le diagnostic de l'endométriose infiltrante profonde : Une revue systématique et une méta-analyse des études de précision diagnostique. *BMC Women's Health, 20*(4), 3208–3220.