

Female Genital Schistosomiasis (Fallopian Tube)

Jannah A. Tapodoc, MD, DPOGS and Marie Janice Alcantara – Boquiren, MD, FPOGS, FPSRM, FPSGE

Mindanao Center for Reproductive Medicine (Consortium Program of Brokenshire Medical Center & Davao Regional Medical Center)

Abstract

Female genital schistosomiasis (FGS) is a chronic form of urogenital schistosomiasis, associated with *Schistosoma haematobium* infection. It is linked to contaminated water exposure and poverty that increases the risk of poor sexual and reproductive health in women, including infertility, and a heightened susceptibility to sexually transmitted infections. The diagnosis of FGS begins with a high index of suspicion in female patients living in *Schistosoma*-endemic areas who present with vaginal or pelvic symptoms with or without hematuria. This paper presents the case of a 37 year old G1P1 (0100) who presented with chronic pelvic pain due to Pelvic Inflammatory Disease with bilateral hydrosalpinges. Schistosomiasis was detected on histopathology after surgical resection of the diseased fallopian tubes. This case highlights the importance of a high index of suspicion for prompt and accurate diagnosis of FGS.

Key words: Female genital schistosomiasis, hydrosalpinges, infertility, schistosomiasis, urogenital schistosomiasis

Introduction

Human schistosomiasis continues to pose a significant public health challenge in various tropical regions. An estimated 261 million individuals need treatment for schistosomiasis, with up to 659 million at risk.¹

This disease is a chronic and acute parasitic infection caused by blood flukes (trematode worms) belonging to the genus *Schistosoma*. In 2021, approximately 251.4 million people required preventive treatment. Schistosomiasis predominantly impacts impoverished and rural communities, particularly those engaged in agriculture and fishing. Women who perform household tasks, such as doing laundry in contaminated water, are also vulnerable and may develop female genital schistosomiasis (FGS).²

*For correspondence: jnnhtpdc@gmail.com

Female genital schistosomiasis (FGS) is a gynecological condition caused by parasites that often goes underreported, misdiagnosed, and remains largely untreated, affecting around 56 million women and girls worldwide.³ It is a chronic form of urogenital schistosomiasis, a disease linked to water exposure and poverty that increases the risk of poor sexual and reproductive health in women, including complications during pregnancy, infertility, and a heightened susceptibility to sexually transmitted infections (STIs) like HIV.⁴ Female genital schistosomiasis (FGS) is primarily associated with *Schistosoma haematobium* infection. Due to the nature of its symptoms, women frequently seek medical assistance for infertility or STI symptoms. As a result, FGS is often overlooked in reproductive age women residing in areas where *S. haematobium* is endemic, largely due to a lack of awareness among healthcare providers. A higher level of suspicion can facilitate preoperative

diagnosis of FGS, potentially preventing unnecessary surgeries and misdiagnosis of STIs.¹

Diagnosing FGS poses challenges as there is no universally accepted reference standard for screening and diagnosis. Microscopy, the traditional diagnostic method for schistosomiasis, has limitations concerning genital diseases, as there is no direct link between the presence of *S. haematobium* eggs in urine and FGS.⁵

The Case

A 37 year old, G1P1 (0100), married from Bunawan, Agusan del Sur consulted a private physician due to amenorrhea and hypogastric pain. Two years prior to consultation, patient experienced episodes of amenorrhea since she gave birth to a stillborn baby. No consultation was done and no medications were taken. Thinking it was a normal process since she had just given birth, she tolerated her condition.

Seven months prior to admission, the patient consulted a private obstetrician due to amenorrhea and dysuria. Transvaginal ultrasound was done which revealed normal results. Laboratory work up likewise revealed normal results, except for presence of pus and bacteria in the urine. She was prescribed Cefuroxime 500mg/tab BID for 7 days. The patient was also advised lifestyle modification, but no medications were given for amenorrhea. She was lost to follow up after her dysuria was relieved. Four months prior to admission, the patient noted recurrence of dysuria and persistence of amenorrhea, hence she consulted her private obstetrician. Urinalysis was done which revealed pyuria. Urine culture was requested and patient was given another course of Cefuroxime 500mg/tab bid for 7 days. She was then referred to a reproductive medicine specialist.

One month prior to admission, the patient consulted a reproductive medicine specialist to address her amenorrhea. Transvaginal ultrasound was done which revealed consideration of bilateral endometrioma with right hydrosalpinx; endometrial thickness was 0.66 cm. Serum prolactin was within normal, and antimullerian hormone (AMH) was low. She was given oral contraceptive pills, and she noted occurrence of menses after taking the pills.

One week prior to admission, the patient experienced prolonged menses, with episodes of vaginal spotting soaking 1-2 pantyliners per day. She had mild hypogastric pain with pain scale 4-5/10. She had her follow up check-up with her private obstetrician and was advised for laparoscopic right salpingectomy with bilateral oophorocystectomy and was subsequently admitted.

Patient had no medical comorbidities. Family, personal and social histories were unremarkable. The patient had her menarche at 14 years old, with subsequent menses occurring regularly every month, lasting for 4 days, moderately soaking 2-3 regular pads per day, with occasional dysmenorrhea. Her first pregnancy was in 2024, which ended at 28 weeks age of gestation due to fetal death in utero. She delivered via normal spontaneous vaginal delivery to a stillborn baby girl with unrecalled birthweight. On the day of admission, the patient was conscious, coherent, ambulatory and not in respiratory distress. Her vital signs were normal. She had no signs of anemia. The abdomen was flabby, soft, with normoactive bowel sounds, but with tenderness upon deep palpation on all quadrants. The external genitalia was grossly normal. Upon bimanual examination, the corpus and adnexae cannot be properly examined due to voluntary guarding and tenderness on hypogastric area. The admitting diagnosis was G1P1 (0100), Pelvic Endometriosis with Bilateral Endometrioma, Right Hematosalpinx, Obese Class I.

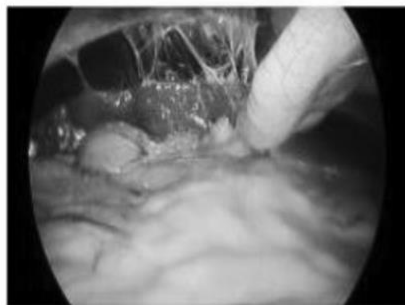
She was scheduled for operative laparoscopy, chromotubation, right salpingectomy, left oophorocystectomy possible Bilateral Salpingectomy with adhesiolysis.

Intraoperatively, there were perihepatic adhesions noted. Filmy adhesions were noted between the uterine serosa and left ovary, and between left fallopian tube and the omentum. The right fallopian tube was dilated to 10cm x 4cm with its middle segment twisted twice. The left fallopian tube was dilated to 7cm x 3cm. The posterior cul de sac was partially obliterated by filmy adhesions at the posterior corpus. Both ovaries were grossly normal (Figure 1). Surgeons proceeded with adhesiolysis and bilateral salpingectomy.

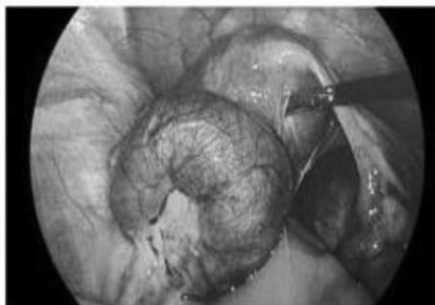
On the first post op day, patient had stable vital signs, ambulatory, with minimal post op pain and

vaginal bleeding. She was voiding freely and had bowel movement. Her incisions were dry, intact, and

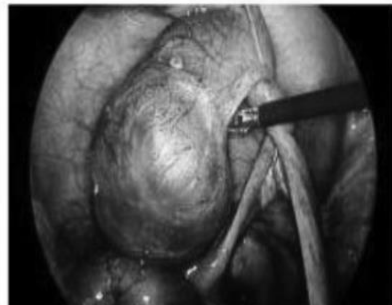
non-erythematous. Her IV antibiotics were shifted to Doxycycline 100mg/tab 2x a day for 14



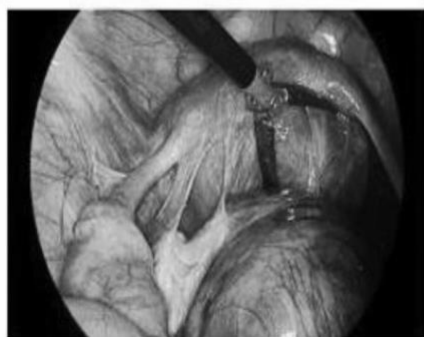
Perihepatic adhesions



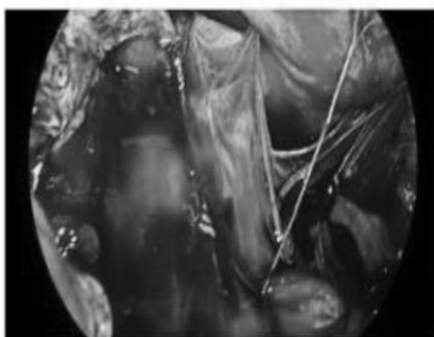
Dilated left fallopian tube



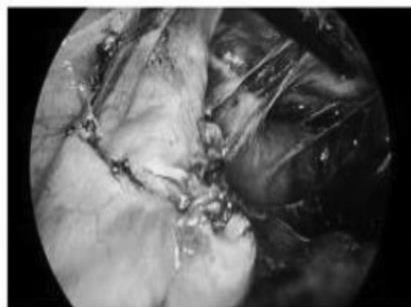
Dilated right fallopian tube with its midsegment twisted twice



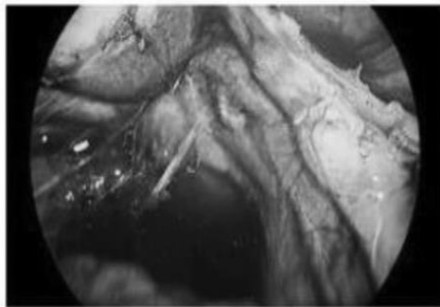
Filmy adhesions between the corpus and the left ovary



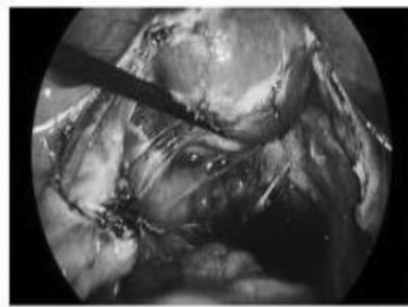
Filmy adhesions between the corpus and the posterior cul de sac



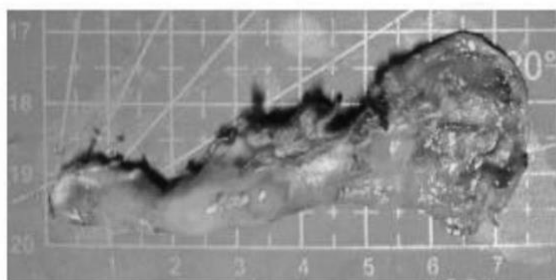
Left ovary post left salpingectomy



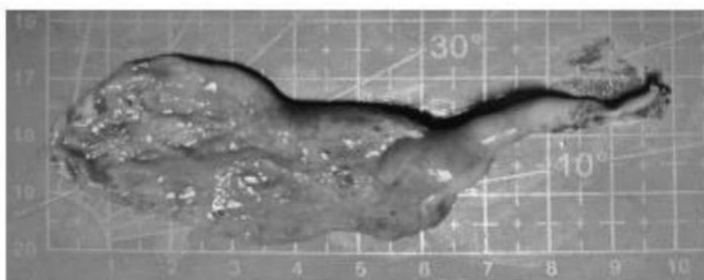
Right ovary post right salpingectomy



Panoramic view post adhesiolysis & bilateral salpingectomy



Gross: Dilated left fallopian tube



Gross: Dilated right fallopian tube

Figure 1. Intraoperative findings

days. She was also given oral pain reliever. Patient was discharged on the second post op day with final diagnosis of G1P1 (0100); Pelvic Inflammatory Disease with Bilateral Hydrosalpinges, Fitz Hugh Curtis Syndrome, Obesity Class I.

The histopathology report revealed the following results: Right Fallopian tube: Hydrosalpinx with congestion and edema; Left Fallopian Tube: Chronic Salpingitis with hydrosalpinx, presence of schistosoma ova (Figure 2). Patient was prescribed Praziquantel 40mg/kg as single dose.

Patient followed up six weeks after taking Praziquantel. Incision sites were dry, and speculum exam was done which revealed presence of vascular bed at 5 o'clock position of the cervix (Figure 3). Fecalysis was requested which revealed absence of schistosoma ova. Patient was again counselled and advised for weight reduction and lifestyle modification. Fertility issues were discussed and the patient was advised to undergo in vitro fertilization.

Discussion

Schistosomiasis is an infection caused by waterborne trematodes that is endemic in 76 countries, with 46 located in Africa. Approximately 207 million individuals are infected, among which 120 million exhibit symptoms, and 20 million are severely ill.⁶ In the Philippines, schistosomiasis is prevalent in 28 out of 81 provinces across 12 regions, with about 12 million individuals exposed to the disease.⁷ The infection affects nearly all areas of the Mindanao region, the eastern Visayas, and several

prevalence of schistosomiasis. The flooding due to the Agusan Marsh's frequent overflow has certainly contributed to this issue.⁶

Flooding is a key natural factor in snail dispersion, negatively affecting schistosomiasis transmission.⁹ It damages water conservation and sanitation facilities, heightening the risk of water contact for both humans and animals, thus increasing the likelihood of *S. japonicum* infection. Moreover, flooding can transport snails to previously unaffected regions, facilitating snail proliferation and increasing transmission risks, especially during catastrophic

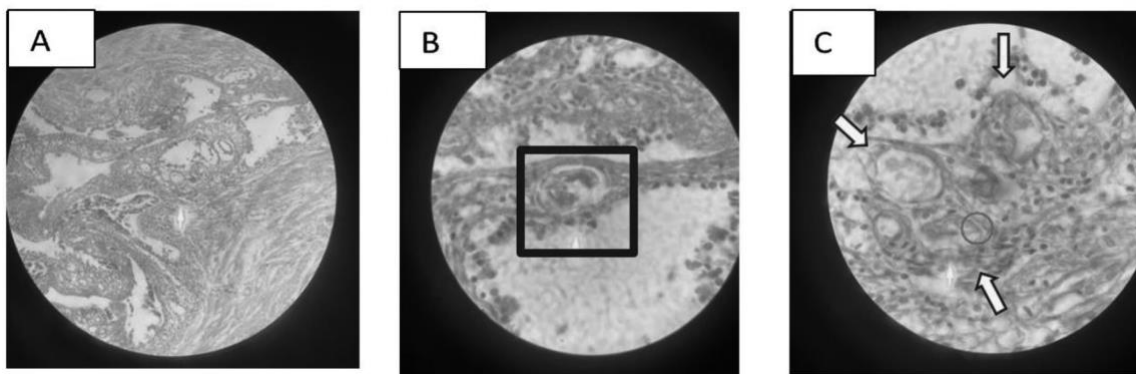
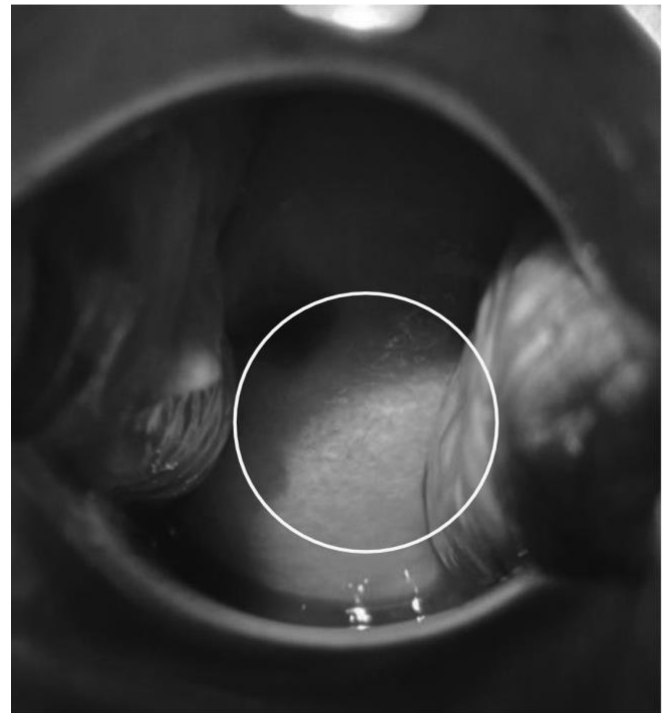


Figure 2. Histologic findings of the left fallopian tube of the patient. (A) Scanning view (B) Closer look of the ovum (black square) (C) Presence of Schistosoma ova (arrows) and the spine of the ova (circle).

provinces in Luzon.⁸ Agusan del Sur, where the patient resides, has historically reported the highest

Figure 3. Presence of vascular bed at 5 o'clock position.

flooding events.¹⁰ This exposure to flooding may be a risk factor for the patient.

Female genital schistosomiasis is predominantly caused by *S. haematobium*, although some case reports have indicated instances involving *S. mansoni*. Adult worms migrate through pelvic organ veins, reaching genital organs through anastomoses, where they lay eggs. Commonly affected gynecological sites include the cervix, fallopian tubes, and uterus.⁵ Clinically, the presentation may include nonspecific, painful, and stigmatizing symptoms such as leukorrhea, vaginal discharge, itching, contact bleeding, chronic abdominal pain, dyspareunia, dysuria, and menstrual irregularities, all resulting from pathological changes to the genital mucosa.^{11,12} In the case of the patient, the patient had experience hypogastric pain and dysuria which could have been the early symptoms of infection. Vulvar and perineal manifestations can encompass hypertrophic, ulcerative, fistulous, or wart-like lesions, often resembling other STIs. Internal lesions, detectable with colposcopy, typically present as sandy patches and rubbery papules.¹³ In some cases, there are abnormal blood vessels or 'neovascularization' which are pathological convoluted (corkscrew), reticular, circular and/or branched and uneven-calibered blood vessels that are visible (under 15 magnification) on the mucosal surface¹⁴ which was seen on the cervix of the patient. Unrecognized and untreated female genital schistosomiasis can elevate the risk of acquiring STIs, including HIV. Additionally, it may lead to chronic inflammatory pelvic disease, subsequently causing salpingitis, infertility, ectopic pregnancy, and benign tumors such as cervical intraepithelial neoplasia (CIN) induced by *Schistosoma*.^{13,14} Potential complications from female genital schistosomiasis include miscarriages, ectopic pregnancy and infertility.¹

Manifestations of schistosomal tubal disease span the spectrum of mild reaction to severe fibrotic granulomatous reaction which may impair tubal motility and/or patency, thus predisposing to ectopic pregnancy and infertility. Furthermore, severe perisalpingitis and peritubal adhesions usually result from fallopian tube ischemia due to ova deposition in the terminal veins of tube.¹⁵

Cervical schistosomiasis, persisting for years as a chronic condition, can damage cervical epithelium, potentially creating a favorable environment for viral infections such as HIV and human papillomavirus (HPV).^{16,17} Studies have retrospectively analyzed the association between cervical cancer and cervical schistosomiasis through histopathological examinations. Cervical schistosomiasis was diagnosed in 1.7%-3% of cervical cancer cases in three studies from Malawi and Tanzania, while the percentage of cervical schistosomiasis detected in cervical tissue without cancer was higher (4.3% - 9.8%).¹⁸ Lesions in the cervix can compromise epithelial integrity, making it plausible for schistosomiasis to increase the risk of HIV transmission similarly to other genital ulcer diseases.¹⁹

The World Health Organization recommends treating schistosomiasis with Praziquantel at a dosage of 40 mg/kg as a single dose, which effectively eliminates adult worms and prevents new lesion development. The identification of one case of FGS may indicate the presence of many others in the same community, as all individuals using the same water source are at risk. In endemic regions, regular treatment for young girls during mass drug administration initiatives is essential to prevent FGS. Treatment can enhance reproductive health and alleviate some symptoms of FGS.¹ During her follow up, patient was requested with fecalysis and cervix was reassessed with note of abnormal branched blood vessels (Figure 3).

Variations in host immune responses could influence individual reactions to praziquantel treatment. Lightly infected individuals may exhibit a less robust immune response, potentially requiring repeat treatments after 2 -4 weeks for better efficacy. If pre-treatment stool or urine examinations indicate the presence of schistosome eggs, followup assessments are recommended 1-2 months post-treatment to confirm successful eradication.²⁰ The diagnosis of FGS begins with a high index of suspicion in female patients living in *Schistosoma* endemic areas who present with vaginal or pelvic symptoms with or without hematuria. Women living in endemic areas with these presentations should be further examined and investigated to make a definitive diagnosis of FGS.¹

Symptoms alone may not be definitive of FGS as many of the symptoms are non-specific and may be caused by several other debilitating disorders of the genital tract such as sexually transmitted diseases.²¹ A high index of suspicion is important for prompt and accurate diagnosis. This will help reduce the anxiety and stigma of FGS by increasing awareness and support, and improve the overall health of affected women.²²

Conclusion

Schistosomiasis is highly endemic in various regions Mindanao, including Agusan del Sur, and can potentially affect the reproductive tract, and mimic symptoms of reproductive tract infections. Reproductive tract infections in endemic areas require investigation, as female genital schistosomiasis can lead to severe reproductive consequences, including chronic inflammation, infertility, ectopic pregnancies, miscarriages, and increased susceptibility to HIV and cervical cancer. Early identification and treatment are vital to prevent complications, reduce stigma, and enhance the overall health of affected women.

References

- World Health Organization. Female genital schistosomiasis: A pocket atlas for clinical healthcare professionals. Available at: https://iris.who.int/bitstream/handle/10665/180863/9789241509299_eng.pdf?sequence=1
- World Health Organization. Schistosomiasis. 2023. Available at: <https://www.who.int/en/news-room/factsheets/detail/schistosomiasis>
- Richardson ST, Franklin AL, Rome ES, Simms-Cendan JS. Global health: Urogenital schistosomiasis in the adolescent girl. *J Pediatr Adolesc Gynecol* 2016; 29(4): 326–32.
- Joint United Nations Programme on HIV/AIDS. No more neglect: Female genital schistosomiasis and HIV—Integrating sexual and reproductive health interventions to improve women's lives. Report No. UNAIDS/ JC2979. UNAIDS. Available at: https://www.unaids.org/sites/default/files/media_asset/female_genital_schistosomiasis_and_hiv_en.pdf
- Rossi B, Previtali L, Salvi M, Gerami R, Tomasoni LR, Quiros-Roldan E. Female genital schistosomiasis: a neglected among the neglected tropical diseases. *Microorganisms* 2024 Feb 24;12(3):458. doi: 10.3390/microorganisms12030458.
- Leonardo L, Rivera P, Sanieel O, Villacorte E, Leaban MA, Crisostomo B, Hernandez L, Baquilod M, Erce E, Martinez R, Velayudhan R. A national baseline prevalence survey of schistosomiasis in the Philippines using stratified two-step systematic cluster sampling design. *J Trop Med* 2012; 2012: 936128. doi: 10.1155/2012/936128. Epub 2012 Feb 15.
- Department of Health. (n.d.). Schistosomiasis: National objectives for health. Available at: <http://www.doh.gov.ph/noh/3-1-7pdf>
- Blas BL, Rosales MI, Lipayon IL, Yasuraoka K, Matsuda H, Hayashi M. The schistosomiasis problem in the Philippines: a review. *Parasitol Int* 2004 Jun;53(2):127-34. doi: 10.1016/j.parint.2004.01.003.
- Lv SB, He TT, Hu F, Li YF, Yuan M, Xie JZ, Li ZG, Li SZ, Lin DD. The impact of flooding on snail spread: the case of endemic schistosomiasis areas in Jiangxi Province, China. *Trop Med Infect Dis* 2023 Apr 30;8(5):259. doi: 10.3390/tropicalmed8050259.
- Guo SY, Li L, Zhang LJ, Li YL, Li SZ, Xu J. From the One Health Perspective: *Schistosomiasis japonica* and flooding. *Pathogens* 2021 Nov 25;10(12):1538. doi: 10.3390/pathogens10121538.
- Kjetland EF, Kurewa EN, Ndhlovu PD, Midzi N, Gwanzura L, Mason PR, Gomo E, Sandvik L, Mduluzi T, Friis H, Gundersen SG. Female genital schistosomiasis—a differential diagnosis to sexually transmitted disease: genital itch and vaginal discharge as indicators of genital *Schistosoma haematobium* morbidity in a cross-sectional study in endemic rural Zimbabwe. *Trop Med Int Health* 2008 Dec;13(12):1509-17. doi: 10.1111/j.13653156.2008.02161.x.
- Kurewa EN, Kjetland EF, Gundersen SG, Gwanzura L, Gomo E, Mduluzi T, Friis H, Midzi N, Ndhlovu PD, Mason PR. Simple clinical manifestations of genital *Schistosoma haematobium* infection in rural Zimbabwean women. *Am J Trop Med Hygiene* 2011; 72(3): 311–9. <https://doi.org/10.4269/ajtmh.2005.72.311>
- Norseth HM, Ndhlovu PD, Kleppa E, Randrianasolo BS, Jourdan PM, Roald B, Holmen SD, Gundersen SG, Bagratee J, Onsrud M. The colposcopic atlas of schistosomiasis in the lower female genital tract based on studies in Malawi, Zimbabwe, Madagascar, and South Africa. *PLoS Neglected Tropical Diseases* 2014; 8(3): e3229. <https://doi.org/10.1371/journal.pntd.0003229>
- Kjetland EF, Leutscher PDC, Ndhlovu PD. A review of female genital schistosomiasis. *Trends in Parasitology* 2012; 28(2): 58–65. <https://doi.org/10.1016/j.pt.2011.10.002>
- Owusu-Bempah A, Odoi AT, Dassah, ET. Genital schistosomiasis leading to ectopic pregnancy and subfertility: A case for parasitic evaluation of gynaecologic patients in schistosomiasis endemic areas. *Case Rep Obstet Gynecol* 2013; 634264. <https://doi.org/10.1155/2013/634264>
- Feldmeier H, Krantz I, Poggensee G. Female genital schistosomiasis—A risk factor for transmission of HIV. *Int J STD & AIDS* 1994; 5(5): 368–72. <https://doi.org/10.1177/095646249400500517>

17. Feldmeier H, Poggensee G, Rohrbach C, de Aguiar Patricio MA, Nogueira Queiroz, JA. Female genital schistosomiasis and human papilloma virus (HPV) infection: A dangerous relationship. *Virus Rev Res* 1997; 2: 119–21.
18. Swai B, Poggensee G, Mtweve S, Krantz I. Female genital schistosomiasis as evidence of a neglected cause for reproductive ill-health: A retrospective histopathological study from Tanzania. *BMC Infect Dis* 2006; 6:134 <https://doi.org/10.1186/1471-2334-6-134>
19. Laga M, Manoka A, Kivuvu M, Malele B, Tuliza M, Nzila N, Goeman J, Behets F, Batter V, Alary M, Piot P. Non-ulcerative sexually transmitted diseases as risk factors for HIV-1 transmission in women: Results from a cohort study. *AIDS* 1993; 7(1): 95–102. <https://doi.org/10.1097/00002030-199301000-00015>
20. Centers for Disease Control and Prevention. Clinical care of schistosomiasis. 2024. Available at: <https://www.cdc.gov/schistosomiasis/hcp/treatment/index.html>
21. Shukla,JD, Kleppa E, Holmen S, Ndhlovu PD, Mtshali A, Sebitloane MH, et al. Female genital schistosomiasis and reproductive tract infections: A cross-sectional study in rural adolescents in South Africa 2019; medRxiv. <https://doi.org/10.1101/19009233>
22. Masong MC, Wepnje GB, Marlene NT, Gamba V, Mengue MT, Kouokam E, et al. Female genital schistosomiasis (FGS) in Cameroon: A formative epidemiological and socioeconomic investigation in eleven rural fishing communities. *PLoS Global Public Health* 2017; 1(7): e0000007. <https://doi.org/10.1371/journal.pgph.0000007>