



PREVALENCE OF SCHISTOSOMA HAEMATOBIIUM INFECTION AMONG VESICOVAGINAL FISTULA PATIENTS IN KATSINA, NIGERIA

Ibrahim Musa Aliyu and Fatimah Usman Adamu

Biochemistry Department, Faculty of Natural and Applied Sciences, Umaru Musa Yar'adua University,
Katsina, Nigeria

DOI: <https://doi.org/10.5281/zenodo.15835016>

Abstract: possible Female Genital Schistosomiasis (FGS), *Schistosoma haematobium* (*S. haematobium*) which can interfere with the wound healing of infection has been identified as an uncommon contributor to VVF, potentially hindering the urogenital tissues and eventual treatment failure. Healing process of urogenital tissues.

Keywords: - Schistosomiasis, VVF patients, was conducted at the National Obstetric Fistula Centre, Katsina (NOFICK) to determine the Prevalence, Babbar-Ruga, Katsina. Prevalence of *S. haematobium* among VVF

Introduction

patients. Direct and catheterized urine collection Schistosomiasis is an infection caused by the methods were employed to collect about 10–15 stool/urine-water borne parasite that is ml of urine sample and examined transmitted when larval forms of the parasite – microscopically for the presence of *S. released* by freshwater snail – penetrate the skin haematobium eggs. A cross-sectional study was of a person during contact with infested water conducted on 297 patients. An overall (Santos et al., 2021). It is caused by the members prevalence of 2.36% was observed. The results of the genus *Schistosoma*, commonly known as obtained revealed that patients from rural areas blood flukes. Out of the nearly 25 species of have a higher prevalence of 85.7% than those *Schistosoma*, most human infections are caused from urban areas, with 14.3%. The occurrence by *s. haematobium*, *Schistosoma mansoni*, related to age revealed that patients aged *Schistosoma japonicum* *S. mekongi*, *S. between* 16-20 years have the highest prevalence intercalatum, and *S. guineensis*, (Nash, 1982; of 57.1%, compared to 21-30 age groups with Webster et al., 2006; Uchendu et al., 2017; 28.6%. Prevalence was notably lowest in WHO, 2022). The microscopic adult worms live individuals older than 30 years, accounting for in the veins draining the urinary tract and just 14.3%. However, a chi-square test of intestines. Most of the eggs they lay are trapped independence showed that there was no in the tissues and the body's reaction to them can significant association between age group and cause massive damage on the host (Lucas et al., Schistosomiasis infection, $X^2 = 0.1655$, $p = 0.921$. Patients with only primary school level of 2013; Anouk, 2018).

education were found to be more infected, with a Schistosomiasis is one of the most prevalent and prevalence of 57.1%, than those with no formal devastating tropical parasitic infections in man, level of education, with a prevalence of 28.6%. globally, second only to malaria in terms of socio-Furthermore, the study also revealed that economic and public health significance in several patients who utilize rivers for their domestic developing countries (Ross et al., 2002; Gryseels activities were more prone to infection than those et al., 2006; Walz et al.,

2015). It is one of the that engage dams, wells, taps, and ponds for such neglected tropical diseases, predominantly found purposes. The research strongly advocated the in the rural areas of Africa, South America, the need for all VVF patients to be screened for Caribbean and the Middle East, in poor communities that have no potable water and infections (WHO, 2015). A few case studies have adequate sanitation. Schistosomiasis affects more identified the relationship between than 78 countries, and nearly 700 million people schistosomiasis and VVF; however, none are exposed to the disease globally with around specifically detail an association between 240 million people infected, and 90% of these schistosomiasis and Obstetric Fistula (Tilstra et infections occur in Africa (Steinmann et al., 2006; al., 2001; Richter et al., 2008). Given that the Brindley et al., 2017; Hotez, 2017). Around presence of *S. haematobium* in the bladder could 4,400 to 200,000 people die from Schistosomiasis lead to inflammation, fibrosis, rupture, each year (VOS et al., 2016; Ejike et al., 2017; De ulceration, and potentially fistula (Stamatakis et Leo et al., 2020; WHO, 2021). Urogenital al., 2009), it could also be associated with Schistosomiasis occurs in both males (male formation of Obstetric Fistula or with delays in genital Schistosomiasis) and females (female genital Schistosomiasis). Both happen when the healing from VVF repair surgery. eggs are lodged in the genital tract thereby causing Female genital Schistosomiasis may be an inflammation and lesions of the urinary and common Gynaecological condition in reproductive organs (Anouk, 2018). Schistosomiasis-endemic areas like Nigeria. In most cases the disease remains undiagnosed. In Nigeria, roughly 101.3 million are at risk of Clinicians are mostly unaware of Female genital infection with 29 million of the people being Schistosomiasis because it is rarely described in infected (Hotez et al., 2009). However, by the year the medical textbooks or nursing curricula in any 2017 the number of people at risk of infection of the countries where Schistosomiasis is reduced to roughly 24 million people, with an endemic (WHO, 2015). prevalence of almost 9.5% (Bishop, 2017). Urogenital Schistosomiasis is endemic in Nigeria Laboratory diagnosis is insufficient, and for and one which continues to pose a public health adult women living in areas that are endemic for problem particularly among school-age children *S. haematobium*, Female genital Schistosomiasis in rural communities (Onyekwere et al., 2022). remains highly widespread and under-diagnosed due to less suspicion among health-care A VVF is an abnormal opening between the professionals. A high index of suspicion will urinary bladder and the vagina in female patients allow a diagnosis of Female genital which results in urine leaking out uncontrollably Schistosomiasis pre-operatively and avoid through the vagina (urinary incontinence). Its unnecessary radical surgery and misdiagnosis of commonly occurs in the developing countries usually because of prolonged, obstructed labour sexually transmitted infections. (Stamakos et al., 2014). During obstructed the disease has been acknowledged as a rare labour, the soft tissues of the pelvis undergo cause of VVF which can interfere with the necrosis from lack of blood supply. This necrosis wound healing of urogenital tissues. This makes results in an abnormal opening between the it to be potentially associated with an increased vagina and the bladder and/or rectum with rate of obstetric fistula among women who subsequent incontinence of urine and/or faeces experience obstructed labour and/or in a greater (Sachdev et al., 2009; Kalilani-Phiri et al., rate of fistula repair failure. Research of this 2010). It poses not only physical but also nature in this hospital will give us a guide on the psychological problems for the women as such more effective ways in the pre-operative patients are usually looked down upon or may be treatment of VVF patients. The main aim of this even abandoned by their husbands and society research is to determine the prevalence of *S. due* to the smell and shame of urine leakage haematobium infection among VVF patients, (Kayondo et al., 2011). Given the nature of the and to correlate the prevalence of *S. signs* and symptoms of the female genital haematobium with the social demography of the schistosomiasis infection, women tend to approach health facilities with complaints of infertility or symptoms of sexually transmitted VVF patients at NOFICK. Methods presence of *S. haematobium* eggs. The urine Study Area and Sampling Site: National specimen was centrifuged at 2000 rpm for 5 Obstetric Fistula Centre, Babbar- Ruga is located minutes, a drop of the sediment was transferred some 3 kilometres along Katsina – Batsari road. unto a clean, grease-free glass slide, covered It is on the coordinates 120 57'N and 70 34' E. The with a cover slip and examined microscopically hospital has a bed capacity of 160. It covers an (using $\times 10$ objectives) for presence of *S. area* of 112,547m². haematobium

eggs (WHO, 1991; Cheesbrough, Sample Size: After acquiring ethical approval 2010; Drew et al., 2018). from the ethics committee of the hospital for the Results

conduct of the study, a total of 297 diagnosed VVF Out of the 297 urine samples examined, 7 turned patients (convenient sampling) who consented to out to be diagnosed with *S. haematobium* participate in the research were recruited. Infection. This gave the overall 2.36% prevalence of Schistosomiasis among the VVF patients

Samples Collection: Direct urine and examined. Patients within the age bracket of 16-20 catheterized urine collection methods were years showed higher prevalence (57.1 %) than employed. A clean, dry, sterile, screw capped other age groups. Age group of ≥ 31 years was the urine container was given to each participant. least affected, with a prevalence of 14.3%. A chi-Each was well informed on how to collect about square test of independence showed that there was 10-15ml of urine sample (Shepherd, 2017; Drew no significant association between age group and et al., 2018). The samples were then sent to the Schistosomiasis infection ($X^2 = 0.1655$, $p = 0.921$) laboratory and subsequently examined for the as shown in table 1.

Table 1; Prevalence of *S. haematobium* among Age Groups

Age Group (Years)	<i>S. haematobium</i> Negative, N=290	<i>S. haematobium</i> Positive, N=7	Total N (%)
16- 20	146(50.3)	4 (57.1)	150(50.5)
21- 30	104 (35.9)	2 (28.6)	106 (35.7)
≥ 31	40 (13.8)	1 (14.3)	41 (13.8)
Total	290 (100)	7 (100)	297 (100)

Majority of the patients (89.56 %) were from rural areas, while the remaining (10.44%) came from urban communities. Among the 7 positive patients, only 1 came from urban community. All other 6 positive patients were from rural settlements, giving a prevalence of 85.7% (see Table 2). **Table 2: Prevalence of *S. haematobium* between Communities**

Community	<i>S. haematobium</i> Negative, N=290	<i>S. haematobium</i> Positive, N=7	Total N(%)
Urban	30(10.3)	1 (14.28)	31(10.4)
Rural	260(89.7)	6 (85.7)	266(89.6)
Total	290 (100)	7 (100)	297((100)

Schistosomiasis infection was observed to be highest in those that utilise water from river for domestic activities. The prevalence of 42.85 % was observed in those that fetch the river water for drinking purposes, while those that exploit river for bathing and laundry had a prevalence of 57.14% each. None of the patients that go to ponds for bathing and laundry was found to be infected with the disease. Incidentally, 1 (with 14.28 % prevalence) patient that use tap water for both drinking, bathing and other domestic purposes was found to be diagnosed with *S. haematobium* infection. Equally, only 1 patient out those that employ dam for domestic activities was found to be infected with the disease. The prevalence of Schistosomiasis in patients that use well water for drinking was 28.57% and 14.28% prevalence was each obtained for those that utilise the well water for bathing and laundry (See table 3).

Table 3: Domestic Activities among the Subjects

	Drinkin g			Bathing			Laundry		
	Neg, N=290	Pos. N=7	Total N (%)	Neg, N=290	Pos. N=7	Total N (%)	Neg. N=290	Pos. N=7	Total N (%)
Well	227(78.27)	2(28.57)	229(77.1)	202(69.66)	1(14.28)	203(68.3)	202(69.66)	1(14.28)	203(68.35)
River	4(1.38)	3 (42.85)	7(2.36)	14(4.83)	4(57.14)	18(6.1)	14(4.83)	4(57.14)	18(6.06)
Tap	58(20.0)	1(14.28)	59(19.86)	65(22.41)	1(14.28)	66(22.2)	65(22.4)	1(14.28)	66(66.0)
Dam	1(0.34)	1(14.28)	2(0.67)	6(2.07)	1(14.28)	7(2.4)	6(2.07)	1(14.28)	7(2.36)
Pond	0	0	0(0)	3(1.03)	0(0)	3(1.0)	3(1.03)	0 (0)	3(1.01)
Total	290	7	297(100)	290	7	297(100)	290	7	297(100)

Most of the patients (57.91 %) had no formal education, with the Schistosomiasis prevalence of 28.6%. Patients with only primary school education (31.65%) had the highest Schistosomiasis prevalence of 57.1%. Out of the total patients, 8.08% attended secondary schools and had a Schistosomiasis prevalence of 14.3%. The infection was not detected in all the patients that had a level of postsecondary school education (2.36%) (See Table 4).

Table 4: Level of Education Among the Patients

Category	<i>S. haematobium</i> Negative, N=290	<i>S. haematobium</i> Positive, N=7	Total N (%)
None	170 (58.6)	2(28.6)	172(57.9)
Primary	90 (31.0)	4(57.1)	94 (31.65)
Secondary	23 (7.9)	1(14.3)	24(8.08)

Post Secondary	7 (2.4)	0 (0)	7(2.36)
Total	290 (100)	7	297(100)

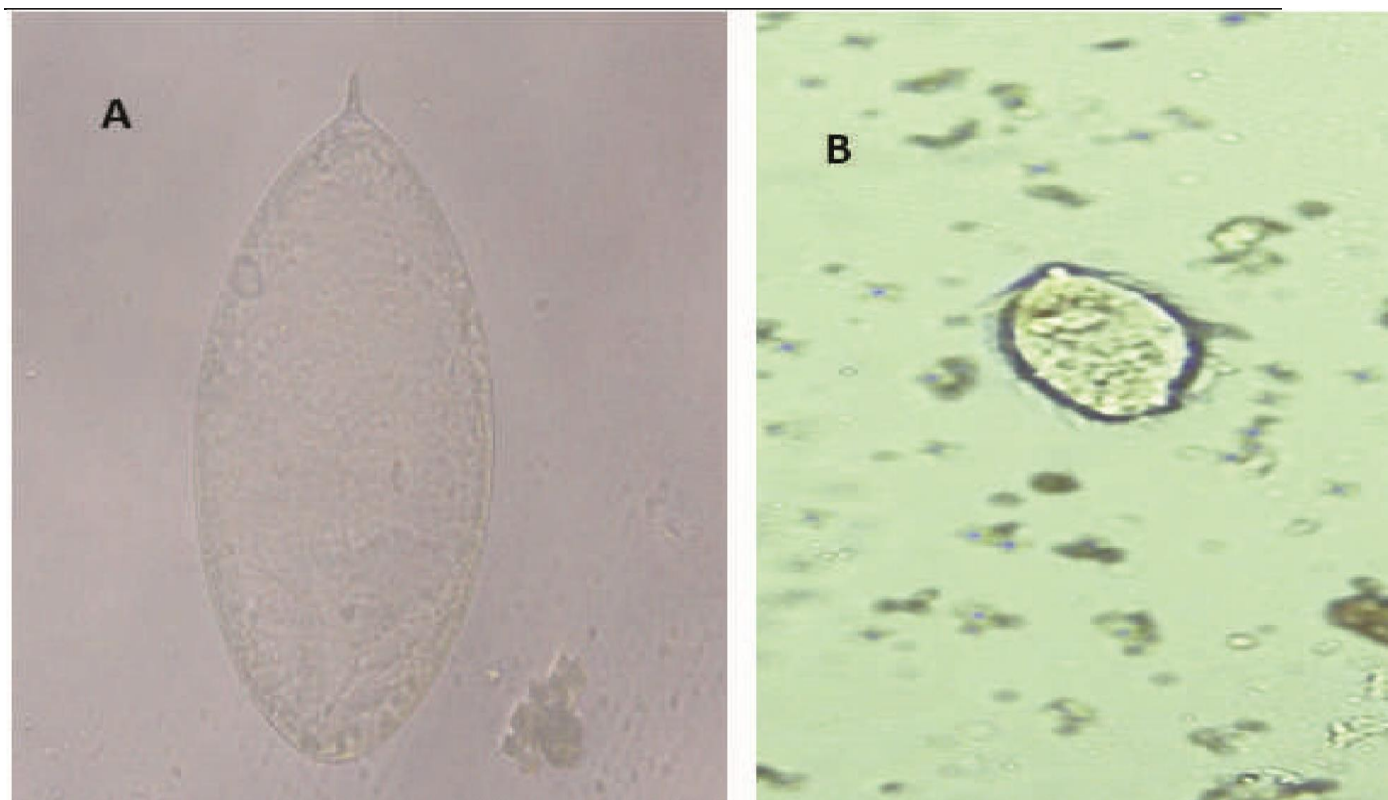


Figure 1: *S. haematobium* egg X40 (A) and miracidium X10 (B)

Discussion

Individuals residing in rural areas where the This research recognized the occurrence of *S. haematobium* among patients in the Obstetric prone to Schistosomiasis infection when Fistula Centre in NOFICK, with a prevalence of compared to urban dwellers as expressed in table 2.63%. This agrees with the research findings by 2. The findings confirmed the work of Klohe et Drew et al. (2018), which found female genital al. (2021), where the team identified that rural Schistosomiasis among obstetric fistula patients in communities exposed to the predisposing Lilongwe, Malawi, with the prevalence of 2.0%. elements became more infected than the urban the research also agrees with the findings by a dwellers. The only positive patient from the pervious report which did not find an association urban community migrated from rural between urinary Schistosomiasis infection and settlement, where the patient confessed to have Obstetric fistula, despite the biologic probability used pond water for their domestic purposes. of *S. haematobium* contributing to Obstetric Probably, the subject might have contracted the Fistula (Tilstra et al., 2011). infection while residing in that rural community. The patient experienced urinary incontinence; younger adults are more infected with the disease than older ones as shown in table 1. This may not dysuria and uremia.

be unconnected with the routine domestic the remaining positive patients underwent VVF activities they involved themselves, such as surgeries of various types, including Right fetching water, laundry and engaging in some ureteric reimplantation, 4th degree repair, aspects of life that may expose them to be in urethrization and fixation. Follow up showed contact with the contaminated water as indicated that none of the positive

patients that underwent in table 3. This agrees with the work of Downs et al. (2011) and Ekpo et al. (2017), who separately indicated that the infection might not have found that Schistosomiasis prevalence was higher affected their wound healing. Contrary to some in younger subjects than adults. theories on positive relationship between

Schistosomiasis infection and obstetric VVF 2006.02.022 development or unsuccessful VVF repair (Drew Bishop, H.G. (2017). Menace of *et al.*, 2018). Schistosomiasis: its true neglected nature in Nigeria. Men Crave Online Journal of Public

Conclusion

Health; **6(5)**: 1-7. 10.15406/mojh2017.

Water sources, especially river and dam for 06.00186 domestic usage and occupation were identified as Brindley, P. J., and Hotez, P. J. (2013). Break the most important determining epidemiological Out: urogenital schistosomiasis and factors in the prevalence of the disease. Although *Schistosoma haematobium* infection in the *S. haematobium* has the potential to be a risk factor post-genomic era. *PLoS Neglected Tropical* for obstetric VVF formation, the prevalence of the *Diseases*; **7(3)**: e1961. <https://doi.org/10.1371/journal.pntd.0001961> infection was not very alarming among the VVF 1371/journal.pntd.0001961 patients in NOFICK. Cheesbrough, M. (2010). District Laboratory Practice in Tropical Countries. 2nd Edition,

Recommendations

Cambridge University Press, Cambridge,

1. Serological screening tests (Rapid United Kingdom.Diagnostic Tests) for urinary De Leo, G. A., Stensgaard, A. S., Sokolow, S. H., Schistosomiasis among VVF patients in N'Goran, E. K., Chamberlin, A. J., Yang, G. NOFICK should be employed to identify J., et al. (2020). Schistosomiasis and climate cases early and provide timely treatment. *change. The British Medical Journal*; **371**:

2. More advanced diagnostic methods, such as M4324. <https://doi.org/10.1136/bmj.m4324> Histological method of *S. haematobium* Downs, J. A., Mguta, C., Kaatano, G. M., et al. identification should also be advocated (2011). Urogenital schistosomiasis in Further research should be encouraged to women of reproductive age in Tanzania's understand the factors contributing to the Lake Victoria region. The American Journal prevalence of urinary Schistosomiasis in of Tropical Medicine and Hygiene; **84(3)**: VVF patients and monitor changes in 364–369. <https://doi.org/10.4269/prevalence over time. ajtmh.2011.10-0585>

3. Public health education to raise awareness Drew, L. B., Tang, J. H., Norris, A., Reese, P. C., about urinary Schistosomiasis, its Mwale, M., Mataya, R., et al. (2018). transmission, and preventive measures in Schistosomiasis among obstetric fistula the community should also be promoted. patients in Lilongwe, Malawi. Malawi medical journal: The Journal of Medical

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