

## Original Research Article

### GENITAL MORBIDITY IN WOMEN OF REPRODUCTIVE AGE SUFFERING FROM UROGENITAL SCHISTOSOMIASIS IN KWALE COUNTY, KENYA.

#### ABSTRACT

**Background:** Female genital Schistosomiasis (FGS) caused by *Schistosoma haematobium* is a significant public health problem in women living in endemic areas. An estimated 45 million women in sub-Saharan Africa are infected. Chronic infection is a major cause of morbidity and poverty in endemic areas of developing world.

**Aim:** To determine the infection rate, distribution pattern and genital morbidity of schistosomiasis infection among females of reproductive age in endemic area in Kwale County, Kenya.

**Study Design:** Cross-sectional analytical case control study

**Study area:** Kwale level four hospital. Study subjects came from the hospital catchment area.

**Methodology:** Prevalence was determined by the presence of *Schistosoma* ova in the patient's urine under light microscopy and by detection of both haematuria and proteinuria using urinalysis reagent strip. Intensity of *Schistosoma* infection was determined by scoring the number of eggs per 10ml of urine. Signs of genital involvement of the disease were determined through visual assessment of the genitalia by a gynaecologist. SPSS version 20.0 was used to analyze data.

**Results:** Overall prevalence of *S. haematobium* was 23%. Intensity of infection was low with majority of infected participants (15.8%) carrying light infections (<50 eggs/10ml of urine). Prevalence and intensity of infection was significantly high in women age group 18-23 and 24-29; ( $\chi^2 = 5.778$ ;  $P = 0.017$ ) and ( $\chi^2 = 4.077$ ;  $P = 0.018$ ) respectively. Signs of genital involvement were recorded in 46.7% of infected women. The results of this study indicate that urogenital schistosomiasis is an important health problem in Kwale County and there is need for the Ministry of Health and the County government of Kwale to initiate strategies to control this problem.

**Key words:** Prevalence, Urogenital schistosomiasis, distribution pattern, genital involvement.

#### Introduction

Schistosomiasis due to *Schistosoma haematobium* is a major cause of morbidity in endemic areas of the world infecting more than 110 million people in rural, agricultural and peri-urban areas of Africa and the Middle East. Schistosomiasis is a disease of the poor in the developing world where access to safe drinking water and sanitation is poor. The infection perpetuates poverty in many low- and middle-income communities (1). For a long time *Schistosoma haematobium* has been associated with female genital schistosomiasis in endemic areas (2). Because the urinary and genital tracts are almost always both affected, the disease has been renamed urogenital schistosomiasis, with detection of *S. haematobium* ova in the urine and/or genital tract being diagnostic (3). An estimated 9–13 million women are afflicted with

45 urogenital schistosomiasis in sub-Saharan Africa (4). Up to 75% of women excreting  
46 *S. haematobium* ova in the urine may have genital schistosomiasis (5, 6, 7, 8); and up  
47 to 41% of women in endemic areas have schistosomiasis of the lower reproductive  
48 tract without ova in urine (5, 9).

49  
50 Studies have shown that *S. haematobium* ova may be distributed in all the pelvic  
51 organs with cervix being the most commonly affected, followed by the vagina,  
52 ovaries, fallopian tubes, vulva and the uterus (10). Kwale County in Coastal Kenya  
53 has been endemic for the disease since 1981 when the first baseline study on  
54 prevalence and intensity of infection was conducted and recorded as 68.2% and 50.0  
55 eggs/hour respectfully (11). Transmission of infection in the area occurs primarily at  
56 local surface ponds formed by springs and rivers and the accumulation of seasonal  
57 rainwater which serve as habitat for the snail intermediate host, mainly *Bulinus*  
58 *nasutus*, *B. africanus* and *B. globosus* (12).

59  
60 Research has shown that in communities where the prevalence of schistosomiasis is  
61 at least moderate in children (50–90%), women continue to have urogenital  
62 schistosomiasis throughout their teens and twenties (13,14). Another research  
63 carried out by Kihara in Kwale (15) yielded the same observations where both the  
64 prevalence and intensity of infection with urinary schistosomiasis peaked at late-  
65 adolescence to young adulthood (16-26 year), and then declined in the 27-37 age-  
66 group, and even further in the >37 age-group, reducing from 37.6% to 28.5% to  
67 19.2% and intensity from 57.16 eggs/10ml to 35.46 eggs/10ml to 3.31 eggs/10ml  
68 respectively (15).

69

## 70 **Materials and methods**

### 71 **Study design**

72 This study adopted a cross-sectional analytical case-control design where cases and  
73 controls were female patients visiting Kwale sub-County Hospital with gynaecological  
74 complaints. Cases comprised those who tested positive for schistosomiasis while the  
75 control group comprised all females who tested negative for schistosomiasis.

### 76 **Study Area**

77 The site of this study was Kwale sub-County Hospital, located in Kwale Town, Kwale  
78 County, Kenya. Kwale County is in South Coast of Coast Province, Kenya. Drainage  
79 system is poor and consists of slow running streams. Stationary ponds and shallow  
80 open dams for animal watering are common. Such conditions provide favourable  
81 habitats for development and survival of fresh water snails associated with  
82 transmission of *Schistosoma haematobium* in the area.

### 83 **Study population**

84 The study population comprised 196 women in their reproductive age (18 – 49  
85 years) who visited Kwale Hospital with gynaecological problems. They were drawn  
86 from six different villages in Kwale County namely Tsimba/Vuga, Chirimani, Mtchang  
87 atamu, Mwachinga, Mwaluphamba and Ngonzini.

### 88 **Sampling techniques**

89 The study employed non-probability sampling techniques. Purposive sampling was  
90 used to select specific respondents who fit the criteria of the study population i.e.

91 adult female patients of reproductive age who visited the hospital with  
92 gynaecological complaints.

### 93 **Data collection techniques**

#### 94 **Prevalence and intensity of *Schistosoma haematobium* infection**

95 Studies on prevalence and intensity of *Schistosoma haematobium* was  
96 accomplished by detection of *Schistosoma haematobium* eggs under microscopy  
97 and detection of both proteinuria and haematuria by urinalysis reagent strip. All  
98 participants with urine containing *Schistosoma haematobium* eggs and/or positive  
99 urinalysis test were treated with praziquantel 40mg/kg body weight (16).

100 Each participant was given a sterile 40 ml universal bottle to provide terminal urine  
101 between 10.00 am and 1.00 pm. Each bottle was labeled to correspond to the study  
102 identification number issued to each participant. From each participant, 10ml urine  
103 specimen was filtered from the sample using Nuclepore urine filtration kit as  
104 described by Kahama *et al.*, (17). Using a blunt ended forceps the filter was  
105 transferred to a slide. A drop of physiological saline was added and then covered  
106 with a cover glass and examined under a microscope using 10 × objectives. The  
107 number of *Schistosoma* eggs was counted and reported as the number of eggs per  
108 10ml of urine, reflecting the intensity of *S. haematobium*. Intensity of infection was  
109 categorized as light if the eggs were less than 50 per 10ml of urine, and heavy if  
110 eggs were equal to or more than 50 per 10ml of urine (18).

#### 111 **Biochemical tests for haematuria and proteinuria**

112 Urinalysis test for presence of blood and proteins in urine was done using Uro-  
113 Labstix 3 (Miles-Sankyo Co. Ltd). All participants with negative urinalysis and  
114 parasitological tests were used as controls. A cellulose strip was dipped in a urine  
115 specimen contained in a well labeled sterile test tube. After a few seconds the strip  
116 was removed and observed for color changes. A change from light yellow to a range  
117 of blue colors indicated presence of haemoglobin while blue spots indicated intact  
118 erythrocytes. Any change of color to green indicated presence of proteins (19)

#### 119 **Gynaecological examination for genital involvement**

120 The women were invited to undergo a gynaecological examination by a qualified  
121 Gynaecologist. Examination of external genitalia, vagina and cervix was done (using  
122 disposable speculae). If pathological changes were observed in the cervix and the  
123 patient consented, cervical cancer screening tests were done using visual inspection  
124 methods. These were; Visual Inspection with 5% Acetic Acid (VIA) and Visual  
125 Inspection with Lugol's Iodine (VILI). All participants who tested positive with either  
126 VIA or VILI were referred appropriately to the next level hospital.

#### 127 **Data analysis**

128 Microsoft Excel 2007 and SPSS version 20.0 were used to perform data analyses.  
129 Descriptive statistics was done by running frequencies, means and cross-  
130 tabulations. Further comparative analysis between variables was done using Chi-  
131 square test with 95% confidence intervals (CIs).

## RESULTS

### Demographic characteristics and distribution pattern of *S. haematobium* infection among participants

The greatest number of participants (17.8%) came from Tsimba-Vuga area which is very close to Kwale town while the least participation (9.7%) was from Mwachinga. Majority of participants were housewives (50.5%) and age group 30-35 years were the most (29.6%).

Prevalence of infection was significantly high ( $\chi^2=5.778$ ;  $df = 4$ ;  $P = 0.017$ ) among younger women aged 18-23 (35.3%) and 24-29 (26.8%) compared to other age groups. Most of the participants who tested positive for Schistosomiasis were (small traders) fishmongers (37.5%) while all participants in formal employment tested negative for schistosomiasis, though a comparison of means between various groups did not yield significant differences ( $\chi^2= 7.574$ ;  $df = 6$ ;  $P= 0.271$ ) Prevalence of infection varied by villages where Chirimani recorded the highest infection rate (36.4%) and the lowest was recorded in Mwachinga but the difference was not statistically significant ( $\chi^2 = 2.167$ ;  $df = 6$ ;  $P > 0.05$ ) Table 1.

**Table 1: Demographic characteristics and distribution pattern of *S. haematobium* infection among participants**

| Participants (%)    |               |      | Prevalence (%) | X <sup>2</sup> | df | P-value |
|---------------------|---------------|------|----------------|----------------|----|---------|
| Residence           | Tsimba-Vuga   | 17.8 | 28.6           | 8.088          | 5  | 0.232   |
|                     | Chirimani     | 11.2 | 36.4           |                |    |         |
|                     | Mtchangatamu  | 27.6 | 16.7           |                |    |         |
|                     | Mwachinga     | 9.7  | 15.8           |                |    |         |
|                     | Mwaluphamba   | 17.3 | 23.5           |                |    |         |
|                     | Ngonzini      | 16.3 | 21.9           |                |    |         |
| Occupation          | Student       | 7.3  | 35.1           | 8.041          | 5  | 0.235   |
|                     | Housewife     | 50.5 | 24.2           |                |    |         |
|                     | Employed      | 5.1  | 0.0            |                |    |         |
|                     | Farmer        | 20.4 | 17.5           |                |    |         |
|                     | Small traders | 6.7  | 37.5           |                |    |         |
|                     | Others        | 10.2 | 30.0           |                |    |         |
| Age of participants | 18-23         | 17.9 | 35.3           | 10.504         | 4  | 0.033   |
|                     | 24-29         | 20.9 | 26.8           |                |    |         |
|                     | 30-35         | 29.6 | 25.4           |                |    |         |
|                     | 36-41         | 18.4 | 5.1            |                |    |         |
|                     | 42-49         | 13.3 | 21.7           |                |    |         |

### Intensity of *Schistosoma haematobium* among the women

Women with light infection (>50 eggs per 10ml urine) were 15.8% while 7.1% had heavy infection (<50 eggs per 10ml urine). The rest of participants (77%) had no infection. Younger women aged 35 years and below were found to have higher intensity of infection compared to those aged 36 years and above. This difference was statistically significant ( $\chi^2 = 4.077$ ;  $df = 4$ ;  $P = 0.018$ ) at 95% confidence level (Figure 1).

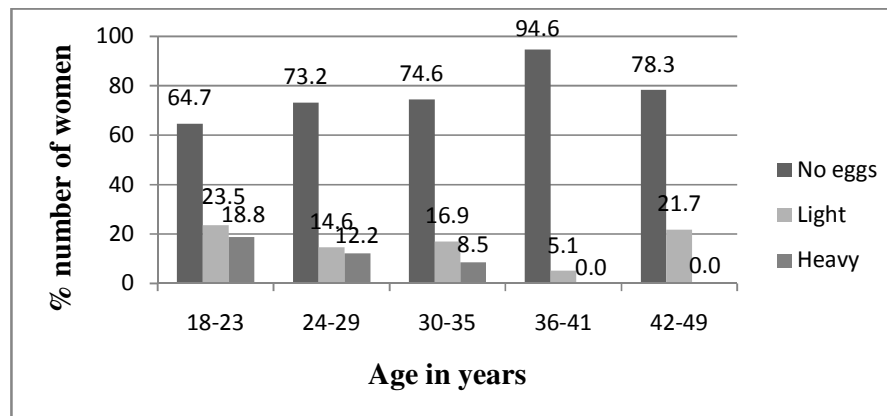


**Figure1: Intensity of *S. haematobium* among the women**

### Genital involvement of schistosomiasis among the women

Visual examination of internal and external genitalia among participants yielded four different pathological signs with genital ulcers leading (12.8%) followed by contact bleeding (11.2%), Sandy patches (8.2%) and the least were tumor-like lesions (3.6%) (Table 2).

Genital pathology in *Schistosoma* positive women was higher than in *Schistosoma* negative women. Two-Sample T-Test showed that sandy patches were significantly ( $T = 3.382$ ;  $P = 0.004$ ) more in positive women (20%) than in negative women (4.6%). Tumorous lesions and bleeding sites were also significant in positive women ( $T = 2.246$ ;  $P = 0.013$  and  $T = 2.138$ ;  $P = 0.017$ ) respectively. Difference in distribution of ulcers in positive women (17.8%) and negative women (11.3%) was not significant ( $T = 1.148$ ;  $P = 0.124$ ) Table 2.

**Table2. Genital lesions and contact bleeding in infected and control group**

| Observation in genitalia | Percentage total (%)<br>N = 196 | Infected (%)<br>N = 45 | Non infected (%)<br>N = 151 | T-test | P-value |
|--------------------------|---------------------------------|------------------------|-----------------------------|--------|---------|
| Sandy patches            | 8.2                             | 20                     | 4.6                         | 3.382  | 0.004   |
| Tumorous lesions         | 3.6                             | 8.9                    | 2.0                         | 2.246  | 0.013   |

|                |      |      |      |           |       |
|----------------|------|------|------|-----------|-------|
| Ulcerations    | 12.8 | 17.8 | 11.3 | 1.14<br>8 | 0.124 |
| Bleeding sites | 11.2 | 20   | 8.6  | 2.13<br>8 | 0.017 |

## DISCUSSION

Findings in this study demonstrated female genital schistosomiasis as a major cause of hidden morbidity in the infected females in Kwale County, Kenya. Previous studies in the region reported the region to be highly endemic for urinary schistosomiasis mainly due to high presence of the *Bulinus* species of the flesh water snails which are the main vectors of *Schistosoma haematobium* (20).

High rate of urinary schistosomiasis infection (23%) was recorded in this study. Local people have specific symptoms that they associate with urinary schistosomiasis; passing urine with blood commonly known as “kichocho” in native language (15). Earlier studies reported a high prevalence of infection in the area; 33.4% (15), 18.2% (21); 43.2% (22), 32.4% (23) and 53.8%, (24). Infection rate in the current study was significantly higher in women of younger age group 18-23 and 24-29 years. Earlier studies associated such high infection rates to raised water contact activities in younger age groups (11, 13). Majority of infected women in the current study were small traders (fishmongers) (37.5%), students (35.1%) and housewives (24.2%). It is expected that fishmongers and housewives have higher water contact level in course of their daily chores as compared to women in other occupations. According to WHO, (25) adults considered to be at risk in endemic areas are people with occupations involving contact with infested water, such as fishermen, farmers, irrigation workers, and women whose domestic tasks bring them into contact with infested water (25), similar observation were also shared by Bolanji et al., (26) and Njoku et al., (27).

Prevalence and intensity of *S. haematobium* varied among villages with Chirimani and Tshipa-Vuga area demonstrating higher prevalence than other areas 36.4% and 28.6% respectively. Higher prevalence in Chirimani and Tsimba-Vuga could be attributed to low level of awareness on schistosomiasis and its transmission potential. Mtsangatamu and Mwachinga villages which are in Kwale hinterland had a long exposure to schistosomiasis control programs (28) while no major surveillance programme have taken place in Tsimba and Chirimani. Considering the chronic nature of schistosomiasis, the females in the later villages could have been suffering from the infection for a long time without seeking treatment. Earlier projects provided piped water to the community in Mtsangatamu and a community dispensary in Mwachinga village where praziquantel (drug of choice for treatment of schistosomiasis) up to now has been included in the medicine kit (28, 29). Secondly, local streams are perennial but slow running in Tsimba and Chirimani hence the local people are continuously exposed to the infection all year round. Other researchers in Nigeria and Kenya have also reported on seasonality of schistosomiasis transmission and further observed that highest transmission occurs after the rainy season when snails are no longer estivating (30, 31, 32, 33, 34). Another study in Kwale observed high infection with *S. haematobium* in some villages and attributed it to continuous contact with infested water at the water sites with high

human activities coupled by consistent lack of intervention such as mass de-worming in the area (15).

Data on the intensity of infection was low with most infected women carrying light infection. However, cases with heavy intensity of infection were reported in women aged 35 years and below. Women in this age bracket who live in schistosomiasis - endemic regions could spend most of their reproductive life either pregnant or lactating, hence delayed administration of praziquantel coupled by low immunity to infections (15). Delay in treatment of more than one year could lead to heavy infection and significant morbidity. Other research findings indicate that intensity of infection follows the same trend as for prevalence whereby the younger ages of 16 – 35 years consistently harbor heavier parasitic burdens, as measured by parasite egg load (13, 14).

Signs of genital involvement were recorded in 46.7% of *Schistosoma* infected women. These genital abnormalities were distributed as follows; genital ulcers (12.8%), contact bleeding (11.2%), sandy patches (8.2%) and tumor-like lesions (3.6%) spread on the cervix and vaginal wall. Poggensee, (9) observed that Pathological lesions in the urogenital system in heavy *S. haematobium* infection were important hidden morbidity. Other clinical studies of women living in areas where *S. haematobium* was endemic yielded similar findings (1, 10, 25, 35, 36, 37). The current study identified tumorous lesions in 3.6% of women participants and were significantly present in *Schistosoma* positive women. Recently, more additional cases of female genital malignancy in association with evidence of *S. haematobium* infection have been published (38). Researchers elsewhere observed that cervical cancer and other malignancies of the female genitalia have been the most frequently reported cancers in association with *S. haematobium* infection (38).

## Conclusions

Female genital schistosomiasis is prevalent in Kwale and the level of genital involvement and morbidity of the disease in infected women is high. Infections are mainly distributed among younger women below 30 years. There is need for the County government of Kwale to conduct proper diagnosis and treatment of the disease. Enhanced community sensitization on transmission and effects of schistosomiasis should be among top health priorities in Kwale and all other endemic areas.

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