Original Research Article

EFFECTS OF FEMALE GENITAL SCHISTOSOMIASIS IN REPRODUCTIVE TRACT OF WOMEN ATTENDING KWALE HOSPITAL IN KWALE COUNTY, KENYA.

ABSTRACT

Background: Female genital Schistosomiasis (FGS) caused by *Schistosoma haematobium* is a significant public health problem among women living in endemic areas. An estimated 45 million women in sub-Saharan Africa are infected. Chronic infection is associated with bleeding disturbances, abdominal-pelvic pain, painful sexual intercourse, uterine fibroids, spontaneous abortion, cervical cancer and increased risk for transmission of HIV**.**

Aim: To determine the infection rate, distribution pattern and associated genital pathology in *S. haematobium* 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 of *S.haematobium* was determined through urine filtration and microscopy for *S.haematobium* eggs and by detection of both haematuria and proteinuria using strip reagent analysis. Intensity of *S.haematobium* infection was determined by scoring the number of eggs per 10ml of urine. Signs of genital involvement 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 intensity infections (≤50 eggs/10ml of urine). Prevalence and intensity of infection was significantly high in women age group 18-23; ($\chi^2 = 5.778$; $P = 0.017$). Signs of genital pathology were recorded in 46.7% of infected women. The results of this study indicate that female genital 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 improve diagnosis and treatment of the disease as well as initiate strategies to control this problem.

Key words: Prevalence, Female genital schistosomiasis, distribution pattern, genital pathology, lesions.

Introduction

Schistosomiasis remains one of the most serious and prevalent diseases worldwide with an estimated 207million people infected (1). About 160 million of infected cases are found in Sub-Sahara Africa (2). Schistosomiasis is a disease of the poor in the developing world where access to safe drinking water and sanitation is poor (1). The disease is a major cause of morbidity and premature mortality in endemic areas of the world (3).

In Kenya, more than 6 million people are infected with urogenital or intestinal schistosomiasis caused by *S. haematobium* and *S. mansoni* respectively (4). In the

year 2003 a pilot control program was initiated in 86 schools in endemic areas where a total of forty thousand (40,000) school age children were involved in a yearly treatment by trained school teachers for 4 consecutive years (5). The success of this pilot program led to implementation of a National school-based de-worming program targeting more than 8 million school age children in all endemic areas. These control programs did not include adult population, especially the most vulnerable group such as women of reproductive age (6) as well as other adults at high risk such as farmers working in irrigation schemes and freshwater fishermen (7,8).

An estimated 9–13 million women are afflicted with urogenital schistosomiasis in sub-Saharan Africa (9). Up to 75% of women excreting *S. haematobium* eggs in the urine may have female genital schistosomiasis (10, 11, 12,13); and up to 41% of women in endemic areas have schistosomiasis of the lower reproductive tract without eggs in urine (10). Studies have shown that *S. haematobium* eggs may be distributed in all the pelvic organs with cervix being the most commonly affected, followed by the vagina, ovaries, fallopian tubes, vulva and the uterus (14).

Kwale County in Coastal Kenya has been endemic for *S. haematobium* since 1981 when the first baseline study on prevalence and intensity of infection was conducted and recorded as 68.2% and 50.0 eggs/hour respectively (15). Despite the heavy burden of the disease on human population in endemic areas of Kenya, only limited control measures and programmes have been put in place. Most of them are school-based targeting primary school children, while others are sporadic projects and short term, targeting a certain community. In Kwale the risk of *S. haematobium* reinfection and late disease after school-based treatment is high. Diagnosis of infection is routinely based on presence of eggs in the urine (16). It is possible that diagnosis and treatment of genital schistosomiasis is not adequately carried out leading to chronic illness among infected females. This research therefore focuses on the infection rate, distribution pattern and genital involvement of *S. haematobium* infection among females of reproductive age in Kwale County, Kenya with an aim to improve diagnosis and treatment of the disease and its effects on the genital tract.

Materials and methods

Study design

This study adopted a cross-sectional analytical case-control design where cases and controls were female patients visiting Kwale level four Hospital with gynaecological complaints. Cases comprised those who tested positive for *S. haematobium* and /or while the control group comprised all females who tested negative for schistosomiasis.

Study Area

The site of this study was Kwale level four Hospital, located in Kwale Town, Kwale County, Kenya. Kwale County is in South Coast of Coast Province, Kenya. Drainage system is poor and consists of slow running streams. Stationary ponds and shallow open dams for animal watering are common. Such conditions provide favourable habitats for development and survival of freshwater snails associated with transmission of *S.haematobium* in the area.

Study population

The study population comprised 196 women in their reproductive age (18 – 49 years) who visited Kwale Hospital with gynaecological problems. They were drawn from Kwale hospital catchment areas namely Tsimba/Vuga, Chirimani, Mtchang atamu, Mwachinga, Mwaluphamba and Ngonzini.

Sampling techniques

The study employed a non-probability sampling techniques. Purposive sampling was used to select respondents who fit the criteria of the study population i.e. adult female patients of reproductive age who visited the hospital with gynaecological complaints.

Data collection techniques

Prevalence and intensity of urinary schistosomiasis

Prevalence and intensity of urinary schistosomiasis was accomplished by detection of *S. haematobium* eggs under microscopy and detection of both proteinuria and haematuria by urinalysis reagent strip. All participants with urine containing *S. haematobium* eggs and/or positive urinalysis test were treated with praziquantel 40mg/kg body weight (17).

Each participant was given a sterile 40ml universal bottle to provide terminal urine between 10.00 am and 1.00 pm. Each bottle was labeled to correspond to the study identification number issued to each participant. From each participant, 10ml urine specimen was filtered from the sample using Nuclepore urine filtration kit as described by Kahama et al. (17). Using a blunt ended forceps the filter was transferred to a slide. A drop of physiological saline was added and then covered with a cover glass and examined under a microscope using ×10 objectives. The number of *S. haematobium* eggs was counted and reported as the number of eggs per 10ml of urine, reflecting the intensity of *S. haematobium* infection. Intensity of infection was categorized as light if the eggs were ≥50 per 10ml of urine, and heavy if eggs were ≤50 per 10ml of urine (2)

Urinalysis test for presence of blood and proteins in urine was done using Uro-Labstix 3 (Miles-Sankyo Co. Ltd). All participants with negative urinalysis and parasitological tests were used as controls. A cellulose strip was dipped in a urine specimen contained in a well labeled sterile test tube. After a few seconds the strip was removed and observed for color changes. A change from light yellow to a range of blue colors indicated presence of haemoglobin while blue spots indicated intact erythrocytes. Any change of color to green indicated presence of proteins (16).

Gynaecological examination for genital involvement

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

Data analysis

The SPSS 20 version was used for data analysis. Descriptive statistics was done by running frequencies, means and cross-tabulations. Chi-square test with 95% confidence intervals (CIs) was used to compare prevalence and intensity of *S.haematobium* infection between cases and controls while two sample t-test was used to compare lesions between the two study groups.

Ethical considerations

The study protocol was reviewed and approved by Kenyatta University Ethics Review Committee (KU-ERC). Further clearance was sought from Ministry of Health Kwale County and from Kwale Hospital Medical Superintendent. Thereafter, informed written consent was obtained from each study subject.

RESULTS

Distribution pattern of *S. haematobium* infection among participants

A total of 196 women were examined for *S. haematobium* infection with age ranges between 18 to 49 years. Most of the subjects (50.5%) were housewives in age group 30-35 years and majority (17.8%) came from Tsimba-Vuga area which is very close to Kwale town.

The overall prevalence of *S. haematobium* infection was 23%. Infection was significantly high (χ^2 =5.778; df = 4; P = 0.017) among younger women aged 18-23 (35.3%) compared to other age groups (Figure 1). Most of the infected subjects were fishmongers (37.5%) while women in formal employment had no infection (Figure 2). Chirimani village recorded the highest infection rate (36.4%) followed by Tsimba-Vuga while Mwachinga recorded the least (Figure 3).

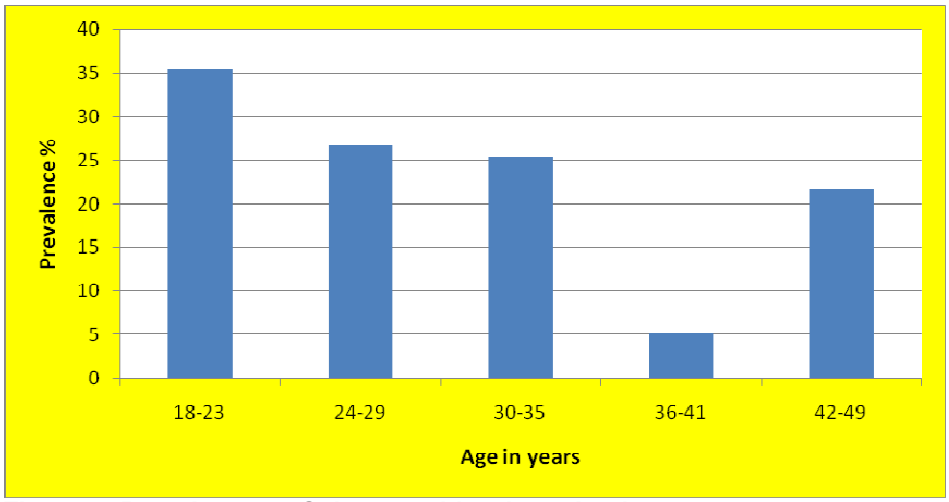

Figure 1: Prevalence of *S. haematobium* infection by age

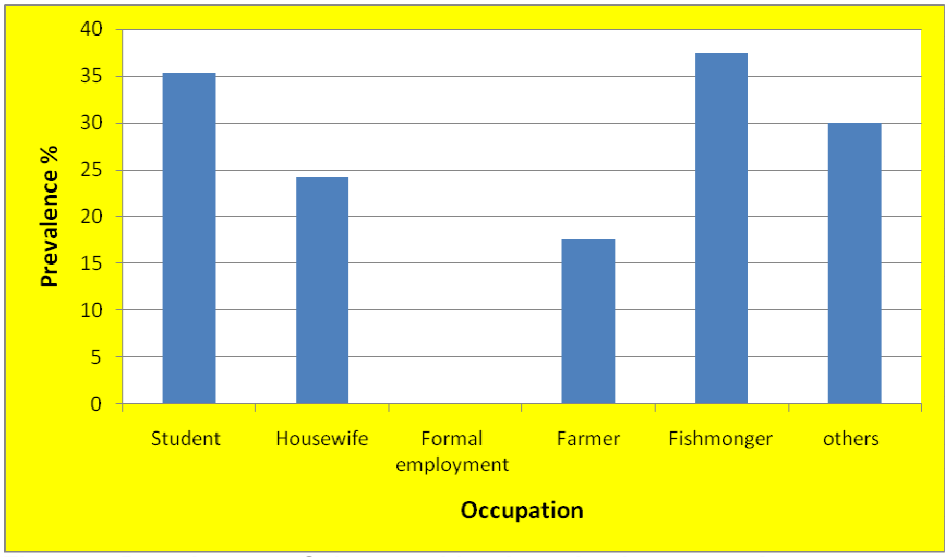

Figure 2: Prevalence of *S. haematobium* infection by occupation

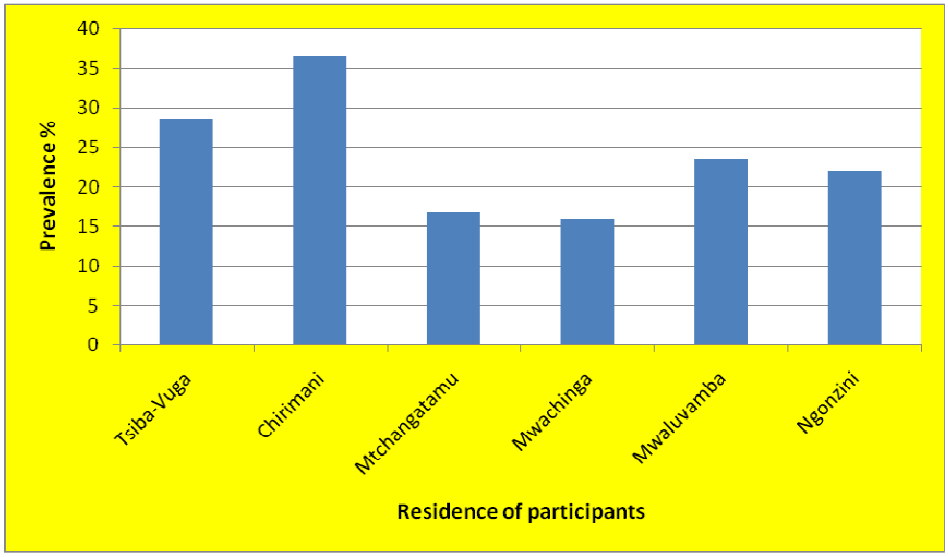

Figure 3: Prevalence of *S. haematobium* infection by residence

Intensity of *S. haematobium* among the study participants

Intensity of infection was low; women with light intensity infection were 15.8% while 7.1% had heavy intensity infection. Younger women aged 35 years and below had significantly (χ^2 = 4.077; df = 4; P = 0.018) higher intensity infection compared to those aged 36 years and above (Figure 4).

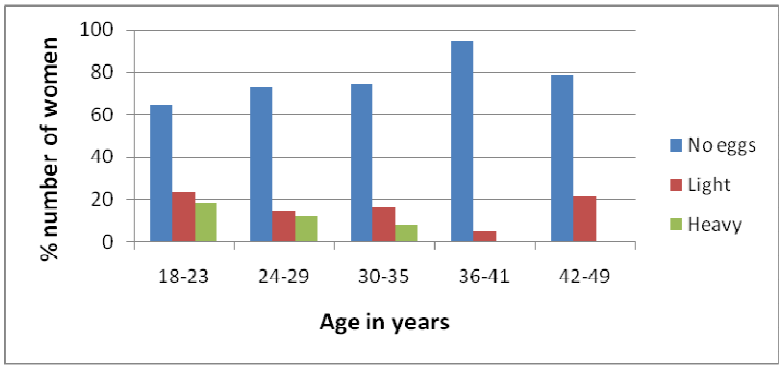

Figure4: Intensity of *S. haematobium* infection among the women

***Schistosoma haematobium* infection and genital pathology**

A total of 46.7% of women with *S.haematobium* infection had signs of genital pathology as follows; genital ulcers 12.8%, contact bleeding 11.2%, sandy patches 8.2% and tumor-like lesions 3.6% (Figure 5). Two-Sample t-test showed that the mean number of sandy patches, tumorous lesions and bleeding sites was significantly higher in positive women (t = 3.382; P = 0.004, t = 2.246; P = 0.013 and t= 2.138; P = 0.017) respectively. Distribution of ulcers was not associated with *S. haematobium* infection (Figure 5).

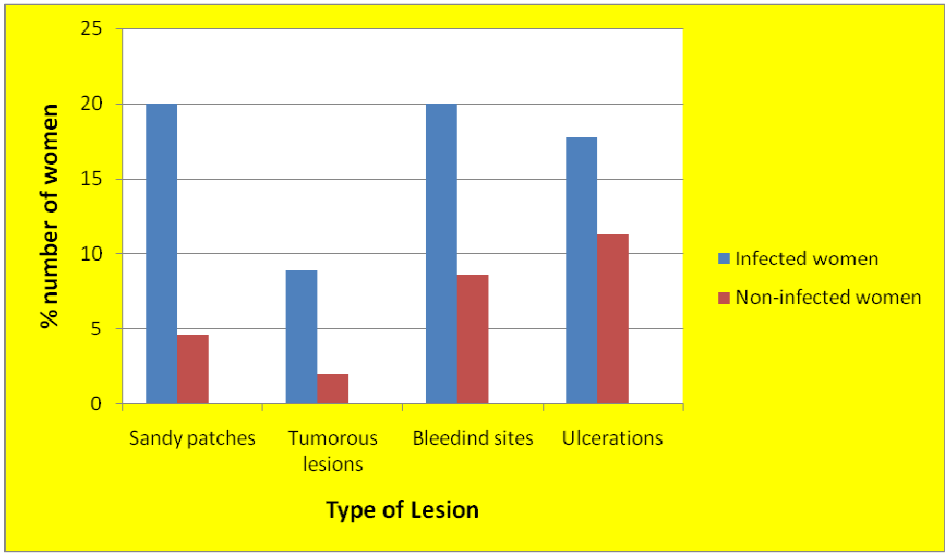

Figure 5: Genital lesions and contact bleeding in infected and non-infected women.

DISCUSSION

Findings of this study indicate that *S.haematobium* infection is still a health concern in Kwale County, Kenya. Infections are sustained by the high presence of *Bulinus* species of freshwater snails which are the vectors for *S. haematobium* (18).

Earlier studies reported a high prevalence of infection in the area; 33.4% (6), 18.2% (19), 43.2% (20), 32.4% (21) and 53.8%, (22). 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 (15, 23). Majority of infected women in the current study were fishmongers (37.5%) closely followed by 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 a report by WHO, 2016 (7) 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 snail infested water (7, 8, 23,24).

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Prevalence and intensity of *S. haematobium* varied among villages with Chirimani and Tshiba-Vuga area demonstrating higher prevalence than other areas 36.4% and 28.6% respectively. This could be attributed to the local streams that are perennial and slow running hence local people are continuously exposed to the infection all year round. Secondly there are no major control programmes in Chirimani , Tsimba and Vuga area. Considering the chronic nature of schistosomiasis, the women in these villages could have been suffering from the infection for a long time without seeking treatment. Another study in Kwale observed high infection with *S. haematobium* in some villages and attributed it to continuous contact with snail infested water and consistent lack of intervention such as mass de-worming in the area (6). Lower infections were observed in Mtsangatamu and Mwachinga villages. These are in Kwale hinterland and had a long exposure to schistosomiasis control programmes (25,26). 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 (25, 26).
Intensity of infection was found to be high in younger 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 with low immunity to infections (6). 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 prevalence whereby the younger ages of 16 – 35 years consistently harbor heavier parasitic burdens, as measured by parasite egg load (27, 28).

Genital abnormalities were recorded in 46.7% of the infected women, spread on the cervix and the vaginal wall. This was a strong pointer to female genital schistosomiasis morbidity due to chronic infection. Poggensee et al. 1999 (13) 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

(29, 30, 31). The current study identified tumorous lesions in 3.6% of women participants. These lesions were significantly more in the *S. haematobium* infected women. Recently, more additional cases of female genital malignancy in association with evidence of *S. haematobium* infection have been published (32).

Conclusion

Female genital schistosomiasis among women of reproductive age is high in Kwale and there is need to conduct proper community diagnosis and treatment of the disease.

Recommendations

The County government of Kwale in collaboration with the national government should put control programmes in place and enhance community sensitization on transmission and prevention of the disease.

Conflict of Interests

The authors confirm that there is no conflict of interests.

Acknowledgement

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