

KNOWLEDGE AND AWARENESS OF FEMALE GENITAL SCHISTOSOMIASIS AMONG PRIMARY AND SECONDARY HEALTHCARE PERSONNEL IN PLATEAU STATE, NIGERIA

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ABSTRACT

Female Genital Schistosomiasis (FGS) is often underdiagnosed and mismanaged due to limited awareness among healthcare providers and the absence of standard diagnostic protocols, particularly in endemic regions such as Nigeria. This study assessed the awareness, knowledge, and clinical experience related to FGS among primary and secondary healthcare personnel in Plateau State, Nigeria. A descriptive cross-sectional survey design was employed. Data were collected using both online self-administered and interviewer-administered semi-structured questionnaires. A total of 792 healthcare workers participated. General awareness of schistosomiasis was high among respondents in both secondary health facilities (SHFs) (92 %) and primary health facilities (PHFs) (94 %). However, awareness of FGS was lower, with 72 % among SHFs and 60 % among PHFs ($P < 0.05$). Among those aware of FGS, primary healthcare workers demonstrated slightly higher knowledge accuracy (98 %) compared to secondary healthcare workers (90 %). Knowledge of FGS diagnosis and WHO guidelines was low, with 57 % among SHFs and 51 % among PHFs. Awareness of WHO diagnostic criteria was also limited (43 % in SHFs and 41 % in PHFs). Although 79 % of SHFs and 85 % of PHFs correctly identified praziquantel as the standard treatment, only 13 and 18 % respectively had encountered FGS cases. The study reveals significant gaps in awareness and clinical knowledge of FGS, particularly at the primary healthcare level. Targeted training and integration of FGS into reproductive health guidelines are recommended to improve early detection, diagnosis, and management.

Keywords: Female genital schistosomiasis, *Schistosoma haematobium*, Healthcare workers, Plateau State, Primary healthcare, Secondary healthcare

INTRODUCTION

Female Genital Schistosomiasis (FGS) is a neglected manifestation of urogenital schistosomiasis, primarily caused by *Schistosoma haematobium*, affecting millions of women and girls in sub-Saharan Africa (World Health Organization [WHO], 2024). The condition is often as a result of the deposition of schistosome eggs in the genital tract, leading to granulomatous inflammation, fibrosis, and vascular alterations within the reproductive system of infected persons. Common clinical manifestations of FGS include genital itching, pelvic pain, vaginal discharge dyspareunia, menstrual abnormalities, infertility, ectopic pregnancy, and cervical lesions that may lead to cervical cancer (UNAIDS, 2019).

Worldwide, an estimated 56 million girls and women suffer from FGS, with the greater burden lying on Sub-Saharan Africa (Lamberti *et al.*, 2024; Mberu *et al.*, 2025). Nigeria carries the highest global burden of schistosomiasis, with *S. haematobium* being the predominant species responsible for urogenital infections, with states like Plateau being reported as highly endemic for the prevalence of urinary schistosomiasis, particularly among school-aged children and women of reproductive age, owing to frequent contact with infested freshwater bodies (Ekanem *et al.*, 2018).

Despite its public health importance, FGS remains underdiagnosed and poorly managed due to limited awareness among healthcare providers and a lack of standardized diagnostic protocols, especially in endemic regions such as Nigeria (Marchese *et al.*, 2024). Therefore, assessing the level of awareness and knowledge of FGS among healthcare workers is essential for identifying gaps that contribute to underdiagnosis and mismanagement. This study aims at evaluating the awareness, knowledge, and clinical experience related to FGS among primary and secondary healthcare personnel in Plateau State, Nigeria.

MATERIALS AND METHODS

Study Area

Plateau State is located in North Central Nigeria between latitudes 8°30'N and 10°30'N and longitudes 8°22'E and 10°38'E. It shares boundaries with Bauchi, Kaduna, Nasarawa, and Taraba States. The state covers approximately 30,913 km² and has a projected population of over 3.5 million people across 17 Local Government Areas. It is divided into three senatorial districts: Plateau North, Plateau Central, and Plateau South. The state features a temperate climate and abundant freshwater bodies that support both livelihoods and transmission of schistosomiasis.

Study Design

A descriptive cross-sectional survey design was used to assess awareness, knowledge, and clinical experience of FGS among healthcare workers in primary and secondary health facilities. Participants included medical doctors, nurses, pharmacists, laboratory scientists, laboratory technicians, and Community Health Extension Workers (CHEWs).

Study Population

Healthcare professionals working in primary and secondary healthcare facilities in Plateau State who consented to participate were included in the study. A total of 792 health workers participated in the survey. Sample size was determined using the Cochran's formula for estimating proportions in a finite population as follows:

$$n_0 = \frac{Z^2 \cdot p \cdot (1 - p)}{e^2}$$

Where: n_0 = initial sample size; Z = Z-score at 95 % confidence level (1.96 for 95 %); p = estimated proportion of the attribute (0.5 for maximum variability); e = margin of error (5 %)

At 95 % confidence level, 5 % margin of error (adjusted to 3.5 % for greater precision), and an estimated proportion of 50 % due to limited prior local data on FGS knowledge, the minimum sample size was calculated as approximately 784. This was further adjusted for a 10 % non-response rate and potential clustering, resulting in a target sample size of 792 healthcare workers.

Data Collection

A stratified random sampling technique was used. Data from secondary health facilities were collected using self-administered online questionnaires, while data from primary health facilities were collected through interviewer-administered questionnaires.

Data Analysis

Data were analyzed using IBM SPSS version 23. Descriptive statistics (frequencies and percentages) were used to summarize variables. Chi-square tests were applied to determine associations between variables, with significance set at $p < 0.05$.

RESULTS AND DISCUSSION

Females constituted the majority of respondents in both SHFs (60 %) and PHFs (64 %) (Figure 1), reflecting the dominance of women in the healthcare workforce, particularly in primary healthcare settings. This aligns with the report of Uzundu *et al.* (2015) and Taiwo *et al.* (2022) that women historically constitute majority of the frontline health personnel in Northern Nigeria, as can also be seen in the gendered enrollment patterns in primary health-care focused disciplines such as nursing, midwifery, community Health Extension Worker (CHEW). According to Uzundu *et al.* (2015), deploying female community health workers directly improves the acceptability and utilisation of maternal, newborn, and child health services, as local women often prefer female providers due to socio-cultural and religious norms

(Uzundu *et al.*, 2015). However, the relatively balanced gender representation across both facility types may indicate gradual improvements in gender equity within the health workforce (Makinde *et al.*, 2018; WHO, 2019).

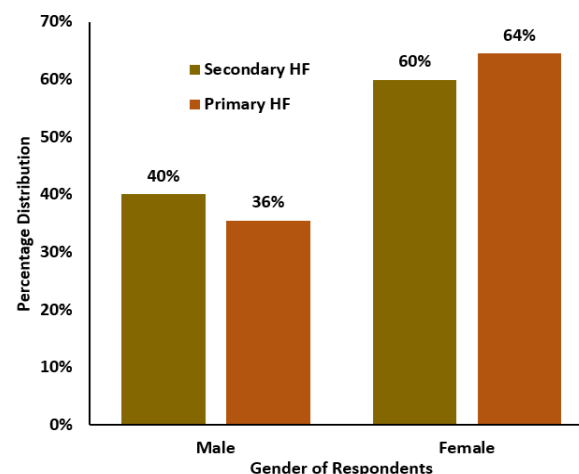


Figure 1: Gender distribution of respondents

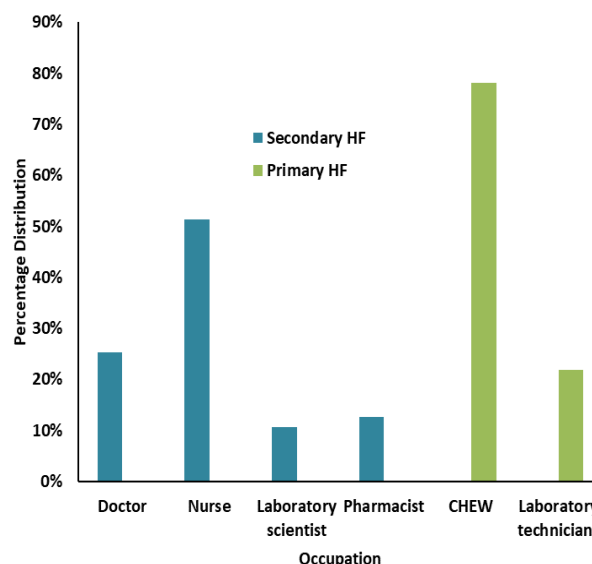


Figure 2: Distribution of respondents by occupation

In SHFs, nurses were the largest group (51 %), followed by doctors (25 %), pharmacists (13 %), and laboratory scientists (11 %). In PHFs, CHEWs dominated (78 %), followed by laboratory technicians (22 %) (Fig. 2). The dominance of CHEWs in PHFs is evidence of their relevance as key players in primary health care delivery in Nigeria, where CHEWs are trained and mandated to play key roles at the community level in order to bridge the gap provided by the chronic shortage of doctors and nurses in the rural and semi-urban areas of the country (Toma *et al.*, 2021; Envuladu *et al.*, 2023).

General awareness of schistosomiasis was high in both SHFs (92 %) and PHFs (94 %). However, awareness of FGS was lower (72 % in SHFs and 60% in PHFs) (Fig. 3). These findings highlight an important gap between general awareness of schistosomiasis and specific knowledge of FGS among healthcare workers. While schistosomiasis is widely recognized, the relatively

lower awareness of FGS—particularly in primary healthcare settings—suggests that this condition remains under-prioritized in routine clinical practice. Given that primary healthcare facilities are the first point of contact for most patients, this gap may contribute to missed or delayed diagnosis (Makinde *et al.*, 2018; Damar *et al.*, 2025).

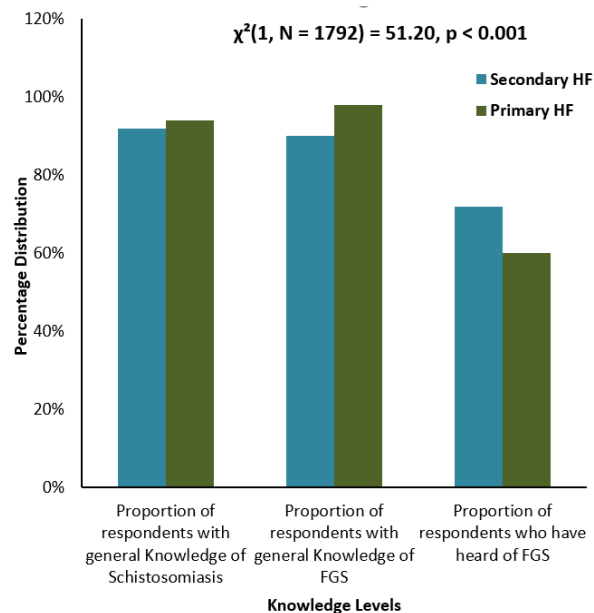


Figure 3: General knowledge of schistosomiasis and FGS among primary and secondary health care workers in Plateau State

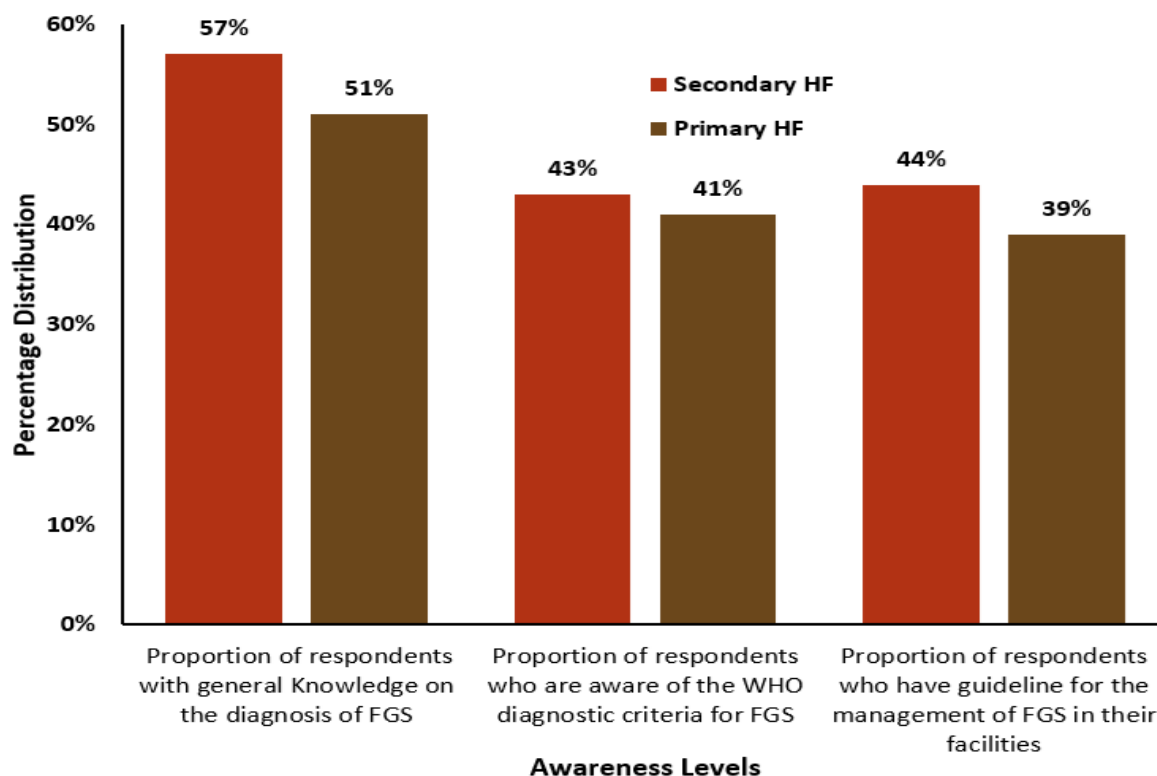


Figure 4: Awareness of the diagnosis of FGS among primary and secondary healthcare workers in Plateau State

Results of awareness of the diagnosis of FGS among primary and secondary healthcare workers in Plateau State (Fig. 4) shows that awareness of WHO diagnostic criteria was low (43 % in SHFs and 41 % in PHFs). Similarly, only 44 % of SHFs and 39 % of PHFs reported having management guidelines for FGS. A chi-square test of independence showed that the difference in diagnostic knowledge between the two facility types was statistically significant ($p < 0.021$). The appreciable lack of awareness and resources constitutes a major diagnostic setback within the Plateau State health system. This is owing to the fact that since the clinical manifestations of FGS caused by *Schistosoma haematobium* often mimic common sexually transmitted infections (STIs), the absence of WHO diagnostic criteria and standard management guidelines presents the risk of FGS misdiagnosis and wrong drug prescriptions (Oyo-Ita *et al.*, 2021; Ekpo *et al.*, 2023).

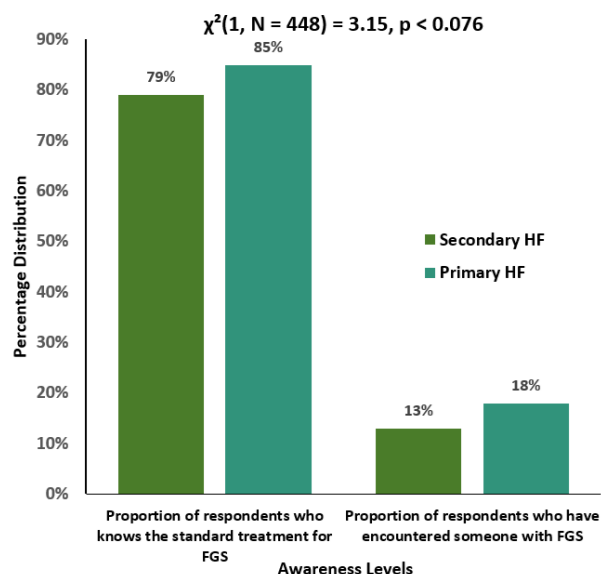


Figure 5: Awareness on the treatment of FGS among primary and secondary healthcare workers in Plateau State

Most respondents correctly identified praziquantel as the treatment (79 % in SHFs and 85 % in PHFs). However, only a small proportion had encountered FGS cases (13 % in SHFs and 18 % in PHFs) (Fig. 5), suggesting underdiagnosis or poor documentation. The low proportion of respondents who reported encountering FGS cases suggests that the condition is either underdiagnosed or poorly documented in routine clinical practice. However, considering the endemicity of schistosomiasis in Nigeria (Damar *et al.*, 2025), under-recognition and misdiagnosis of FGS is the more likely explanation. This implies that without structured capacity building, cases of FGS will continue to go undocumented, thereby leaving thousands of vulnerable women in Plateau State untreated and at risk of irreversible reproductive damage, as similarly reported by Oyo-Ita *et al.* (2021).

CONCLUSION

The study revealed that the majority of health workers in Plateau State were female Community Health Extension Workers (CHEWs) who had a greater general awareness of schistosomiasis than specific awareness of Female Genital Schistosomiasis (FGS), while awareness of the WHO diagnostic criteria among primary and secondary healthcare workers was low—implying that vulnerable women stand the risk of severe, preventable reproductive health complications from misdiagnosis and poor diagnostic competence. Hence, to address these gaps and improve the clinical management of FGS, the Plateau State Ministry of Health must implement urgent training for primary health facility CHEWs and secondary health facility nurses on WHO diagnostic criteria, systematically distribute official management guidelines and visual aids such as the WHO FGS Pocket Atlas, and integrate routine FGS screening into existing maternal, neonatal, and family planning clinics to prevent speculative treatment for FGS and STIs.

Conflict of interest: The authors declare that there is no conflict of interest.

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