Comparative Analysis of the Diagnosis of Schistosoma haematobium Infections

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Abstract:

Combi 10 is a urine reagent strip (dipstick) that detects indirect signs of *S. haematobium* infection, specifically the presence of microhematuria (blood in the urine) and proteinuria (protein in the urine). The spiny eggs of the parasite damage the bladder and urinary tract lining, leading to blood and protein leaking into the urine. The trematode Schistosoma haematobium is the cause of urinary schistosomiasis, a neglected tropical disease. The purpose of this study was to ascertain the frequency and severity of the infection among Makurdi Metropolis primary school students as well as to compare the usage of Combi 10 and filter paper in the diagnosis of Schistosoma hameatobium. 250 students from four different primary schools in the Makurdi Metropolis participated in the study. Students aged 8 to 20 had urine samples taken, and the Medi Test Combi 10 and Polycarbonate Filters in Urine Syringe Filtration Technique (USFT) were used to check for hematuria and Schistosoma haematobium ova. According to microscopic analysis of filter papers, the prevalence of Hematuria was 45% and Schistosoma haematobium was 25.7%. Proteinuria was found to be 70% prevalent. The intensity of infection ranged from light to heavy. Although not statistically significant, overall infection was higher in men (33.3%) than in women (35.8%; P>0.056). There was no discernible variation in the age-specific prevalence, which varied between 11.1% and 40% in the 6–9 and 15–20 age groups, respectively (P >0.056). Additionally, the Poly membrane Filtration process and the usage of Medi-test Combi 10 reagent strips showed a substantial favorable connection. Using combi 10, 120 urine samples tested positive for haematuria, while only 52 tested positive for S. The connection is substantial at the 0.056 level because haematobium is used with poly membrane filter paper. According to the aforementioned findings, S. haematobium is common among elementary school students, and two diagnostic methods that can be utilized to diagnose S. haematobium are Combi 10 and Filter paper. They can both determine the disease's prevalence and offer guidance for treating and getting rid of the infection. Therefore, it is necessary to implement strict control measures, such as giving students praziquantel. The dipstick contains chemical pads that change color when they react with blood and/or protein in the urine. The color change is then compared to a reference chart for a qualitative or semi-quantitative result.

Keywords: Schistosoma haematobium, polycarbonate filters, Medi test Combi 10.

1. Introduction:

Schistosoma haematobium is a trematode that causes urinary schistosomiasis, an infection spread by snails. This parasite impedes the flow of blood in the bladder's venous plexus. This causes the veins to break, which causes haematuria [1]. According to estimates, at least 206.4 million individuals need preventive therapy for schistosomiasis, a neglected tropical disease [2]. Urinary Schistosomiasis can be detected using a variety of diagnostic methods. Infection can be detected using Combi 10 reagent strips and by looking for ova in urine using polycarbonate filters [3]. Morbidity markers of S. aematobium infection include hematuria and proteinuria.

- Rapid and Simple: The test is very fast, easy to perform, and requires minimal training.
- Inexpensive: It's a low-cost screening tool, making it ideal for large-scale field surveys and mass drug administration programs.
- Good Sensitivity for Haematuria: The test for microhematuria is highly sensitive, with some studies showing a sensitivity of up to 100% in endemic areas.

[4]. Poor sanitation, a lack of socioeconomic growth, and an inadequate water supply in the districts are the main causes of schistosomiasis's prevalence in low socioeconomic communities. In endemic areas, both direct and indirect diagnostic techniques have been proposed to facilitate rapid mapping surveys. Over the past few decades, a variety of diagnostic methods have been developed for the diagnosis of schistosomiasis, ranging from simple microscopic detection to complex molecular approaches. According to Kosala [5], there are four primary groups into which the present diagnostic approaches can be divided: The use of cytokines, metabolites, and other schistosome compounds as biomarkers; (i) direct parasitological diagnosis; (ii) immunological assays that identify stage-specific antigens or antibodies; (iii) molecular approaches that identify DNA and RNA in serum, blood, or excreta

[5]. The standard method of diagnosing schistosomiasis is still the microscopic examination of parasite eggs in urine (S. haematobium) or feces (S. mansoni, S. japonicum) during the stage of patent infection, even with the availability of a wide range of diagnostic assays from basic to advanced techniques [5]. If precise diagnostic techniques are applied, schismomiasis can be prevented from developing into acute phases. Therefore, in order to detect infected persons, adequate and sensitive diagnostic tools are used.

2. **Methodology**:

Children in primary schools in Makurdi Metropolis, Benue State, participated in a cross-sectional study design. To raise awareness of the disease's terrible effects, a few primary schools near bodies of water were visited, and urine samples were taken. We collected and retrieved published publications, journals, textbooks, paper presentations, previous projects, and online information about the subject. Urine microscopy was used to look for Schistosoma haematobium eggs after urine samples were taken from elementary schools.

Both Combi 10 dipsticks and filter paper are used for diagnosing *Schistosoma haematobium* infections, but they operate on different principles and have distinct advantages and disadvantages.

Schistosoma haematobium is the causative agent of urinary schistosomiasis, a parasitic disease endemic in many tropical and subtropical regions. Diagnosis is critical for disease control and epidemiological mapping. Two widely applied diagnostic tools are:

1. Combi 10 reagent strips (urine dipsticks): a rapid, point-of-care test that detects microhematuria, proteinuria, and leukocyturia—common indicators of urinary schistosomiasis.
2. Urine filtration technique (filter paper method): a parasitological method in which a measured volume of urine is filtered through a membrane filter, and eggs of *S. haematobium* are microscopically identified and counted.

2.1. Filter Paper Method:

The filter paper method is a microscopic technique that directly detects the parasite's eggs. A urine sample is filtered through a special filter paper, and the eggs trapped on the filter are then viewed and counted under a microscope.

A specific volume of urine (e.g., 10 ml) is passed through a filter paper with a pore size small enough to trap the large *S. haematobium* eggs. The filter paper is then placed on a slide and examined under a microscope.

2.2. Combi 10 Dipstick:

Combi 10 is a urine reagent strip (dipstick) that detects indirect signs of *S. haematobium* infection, specifically the presence of microhematuria (blood in the urine) and proteinuria (protein in the urine). The spiny eggs of the parasite damage the bladder and urinary tract lining, leading to blood and protein leaking into the urine.

- Principle: The dipstick contains chemical pads that change color when they react with blood and/or protein in the urine. The color change is then compared to a reference chart for a qualitative or semi-quantitative result.
- Advantages:
    - Rapid and Simple: The test is very fast, easy to perform, and requires minimal training.
    - Inexpensive: It's a low-cost screening tool, making it ideal for large-scale field surveys and mass drug administration programs.
    - Good Sensitivity for Haematuria: The test for microhematuria is highly sensitive, with some studies showing a sensitivity of up to 100% in endemic areas.
- Disadvantages:
    - Indirect Diagnosis: The dipstick does not detect the parasite's eggs directly. A positive result for hematuria or proteinuria could be due to other conditions, such as kidney stones, urinary tract infections (UTIs), or menstruation. This leads to lower specificity.
    - Lower Sensitivity in Light Infections: While sensitive for moderate to heavy infections, its accuracy decreases in people with very light infections who may not be passing enough eggs to cause detectable hematuria.
    - No Egg Quantification: It can't determine the number of eggs present, which is crucial for assessing the intensity of the infection.

2.3. Moral Aspects:

The Head of Department (HOD) of Benue State University's Department of Biological Science provided a letter of introduction. The Ministry of Health in Benue State also gave its approval. The goals and advantages of the study were properly communicated to the school's authorities.

2.4. Gathering of Urine Samples :

All participation was entirely optional. Urine samples were taken from 202 students who consented; 10–15 ml of urine specimens were taken using sterile, clean, screw-cap plastic containers with wide mouths, in accordance with WHO guidelines that the best time to capture haematobium eggs is between 10 a.m. and 2 p.m.

2.5. Quality Control:

In order to prevent parasite eggs from hatching prior to microscope analysis, urine samples were collected and carried to the laboratory in a dark container that prevented direct light penetration. The samples were processed within 24 hours after collection.

- Direct and Definitive Diagnosis: This is considered the gold standard for diagnosis as it directly visualizes the *S. haematobium* eggs, providing a definitive diagnosis.
- High Specificity: A positive result is highly specific to *S. haematobium* infection as it confirms the presence of the parasite's eggs.
- Egg Quantification: The number of eggs on the filter can be counted, allowing for the determination of infection intensity (eggs per 10 ml of urine). This is vital for clinical management and public health surveys.
- Sample Preservation: Dried filter paper samples can be stored and transported to a laboratory for later analysis, including more advanced molecular tests like PCR (Polymerase Chain Reaction) to detect parasite DNA.

2.6. Assessment of Hematuria:

Urine reagent strips (Medi-Test Combi 10) were used to test for micro-haematuria and proteinuria after the recently passed urine samples were examined macroscopically for gross haematuria. The strips were submerged in urine samples as directed by the manufacturer. On the side of the reagent strip container, the color shift was compared to standard colors. Following Poggensee et al., the protocol was adopted [6]. On the basis of the appearance of bloody urine, obvious haematuria was also noted.

2.7. Identification of Eggs from Schistosoma haematobium :

To filter Schistosoma haematobium eggs from urine, polycarbonate membrane filters (Millipore Comp.) with a 13 mm diameter and a pore size of 12–14 µm were utilized. Using blunt-ended (untoothed) forceps, the polycarbonate membrane filter was gently positioned on the filter support of the filter holder [7]. After that, the filter holder was put back together and fastened to the end of a Luer syringe. After removing the syringe's plunger, a well-mixed urine sample was poured into it until it reached the 10-milliliter level, and the plunger was restored [7]. Sediments were left on the polycarbonate membrane filter paper while the urine was gradually filtered through the chamber while the syringe was held over a beaker [7].

After being unscrewed, the filter holder was set up on racks that were specifically made for it. Using blunt-ended forceps, the filters were taken out of their holders in the lab and placed face up on a microscope slide. A drop of Lugol's iodine was added to the slide using a teat dropper, and it was then covered with a cover glass and studied under a microscope at 10x magnification with the condenser iris closed enough to provide good contrast. Schistosoma haematobium

eggs were meticulously inspected throughout the entire filter. For every 10 milliliters of urine, the number of eggs in the preparation was counted and reported.

A light infection was defined as one to fifty (1–50) eggs per 10 ml of urine, a moderate infection as 51–200 eggs per 10 ml of urine, and a strong infection as more than 200 eggs per 10 ml of urine [7].

2.8. Data Management and Analysis:

All data were entered into an Excel spreadsheet, checked for errors and analyzed using SPSS for windows (version 15.0, SPSS Inc, Chicago, USA). Descriptive statistics was used to analyze prevalence of urinary schistosomiasis. Pearson correlation coefficient (r) was used to test the correlation between haematuria and microscopic examination outcome of urine specimens. Differences and associations were considered significant at Precision (P) value of

<0.05.

2.9. Comparative Summary:

Feature	Combi 10 Dipstick	Filter Paper Method
Diagnostic Principle	Indirect (detects hematuria/proteinuria)	Direct (detects and quantifies eggs)
Nature of Diagnosis	Screening tool, proxy indicator	Confirmatory and definitive diagnosis
Cost	Low	Higher
Ease of Use	Very easy, minimal training	Requires trained personnel
Speed	Very fast (minutes)	Slower (requires filtration and microscopy)
Sensitivity	High for hematuria, lower for light infections	High, but can miss very light infections
Specificity	Lower (hematuria can have other causes)	Very high (confirms egg presence)
Quantification	No	Yes (provides eggs per unit of urine)

2.10. Principle of Diagnosis:

- Combi 10 Strips: Indirect diagnosis by detecting blood/protein in urine as proxies of pathology caused by egg deposition in the urinary tract.
- Filter Paper Technique: Direct diagnosis through visualization and enumeration of parasite eggs under the microscope.

2.11. Sensitivity and Specificity:

- Combi 10 Strips:
    - High sensitivity in detecting microhematuria in moderate to heavy infections.
    - Lower specificity, as hematuria can result from other urinary tract infections, menstruation, or kidney disease.
- Filter Paper Technique:
    - Highly specific because egg detection confirms infection.

- Sensitivity decreases in low-intensity infections (few or no eggs in urine sample).

3. Practicality and Ease of Use:

- Combi 10 Strips:
  - Simple, rapid (results in minutes).
  - No specialized equipment or expertise needed.
  - Useful for field surveys and mass screening.
- Filter Paper Technique:
  - Requires microscope, trained personnel, and laboratory setting.
  - More time-consuming (sample processing and egg counting).

3.1. Cost and Accessibility:

- Combi 10 Strips: Relatively inexpensive, easily portable, and ideal for large-scale screening.
- Filter Paper Technique: Slightly more expensive and logistically challenging in field settings, but still cost-effective compared to molecular diagnostics.

3.2. Epidemiological Utility:

- Combi 10 Strips: Excellent for rapid prevalence estimation in endemic areas; may overestimate infection rates due to false positives.
- Filter Paper Technique: Gold standard for confirmation and quantification of infection intensity (egg counts per 10 mL of urine).

4. Limitations:

- Combi 10 Strips:
  - Cannot differentiate *S. haematobium* infection from other causes of hematuria.
  - Not reliable for monitoring treatment efficacy (hematuria may persist after cure).
- Filter Paper Technique:
  - Low sensitivity in light infections.
  - Labor-intensive and not always feasible for mass diagnosis.

5. Results:

The big, oval, pale yellow-brown ova of S. haematobium were found to have a distinctive terminal spine. Students from four elementary schools in Makurdi Metropolis provided 202

urine samples, 118 of which were male and 84 of which were female, to be tested for Ova of Schistosoma haematobium. There were 52 students who tested positive for S. haematobium infection, and the overall prevalence of urinary schistosomiasis among the students was 26.7%. The prevalence was higher in males (26.3%) than in females (25%). Combi 10 reagent strips are more suitable for field screening, rapid surveys, and community-level prevalence studies, especially in resource-limited settings. Filter paper urine filtration remains the gold standard for definitive diagnosis and intensity measurement, making it crucial for clinical confirmation, treatment evaluation, and research. A combined approach is often recommended: using Combi 10 for initial mass screening, followed by filter paper confirmation in suspected or ambiguous cases.

5.1 Prevalence of S. haematobium Infection in Relation to Age

Age-Related S. haematobium Infection Prevalence

General Pattern

Epidemiological studies across Africa and other endemic regions consistently show that urinary schistosomiasis prevalence and intensity are age-dependent:

1. Children (especially school-aged, 5–15 years):
    - Highest prevalence and intensity of infection.
    - Due to frequent water contact (swimming, playing, bathing, fetching water).
    - Immature or less-developed acquired immunity against schistosomes.
2. Adolescents and Young Adults (15–25 years):
    - Prevalence remains relatively high but often begins to decline in intensity.
    - Reduced exposure (less recreational water contact, more structured activities/work).
3. Adults (>25 years):
    - Prevalence and intensity generally decrease with age.
    - Possible explanations:
        - Reduced exposure to infested water.
        - Gradual development of partial acquired immunity from repeated exposure.
        - Pathological changes may persist even after egg excretion declines.
4. Elderly (>50 years):
    - Lowest prevalence.
    - Many may show chronic complications (fibrosis, calcification, bladder pathology) rather than active infection.

The study participants' age-specific prevalence of S. haematobium ranged from 11.1% to 40% in the 5–9 and 15–19 age groups, respectively. The highest incidence, 40%, was seen in the 15–19 age range, followed by the 10–14 age group, with a prevalence of 25.9%. The prevalence was lowest in the age group of 5–9 (11.1%) (Table 1).

$(\chi^2_{CAL}=8.302, \chi^2_{TAB}=5.99, P>0.05, df = 2)$

5.2 Examining the Sex Distribution of S. haematobium in School-Aged Children As indicated in Table 2, the sex-related prevalence of S. haematobium infection was higher in males than in females. For the study, more men than women volunteered. Males had a prevalence of 26.3%, whilst females had a nearly 25% prevalence. The prevalence of the two sexes did not differ significantly, according to chi-square analysis of the data in Table 2.

$(\chi^2_{CAL}=0.19, \chi^2_{TAB}=3.84, P>0.05 \text{ and } df = 1)$

$(\chi^2_{CAL}=0.19, \chi^2_{TAB}=3.84, P>0.05 \text{ and } d.f = 1)$

3.3 Comparison of Filter Paper and Combi 10 Reagent Strip Screening Outcomes Using carbonate membrane filters, 52 of the 202 urine samples that were analyzed tested positive for S. haematobium ova. Of those, 111 tested positive for Haematuria. According to Table 3, Government Education Authority Primary School (LGEA) had the most samples that tested positive for both hameaturia and Ova using Combi 10 and polycarbonate membrane filters, while Josephine International School had the fewest.

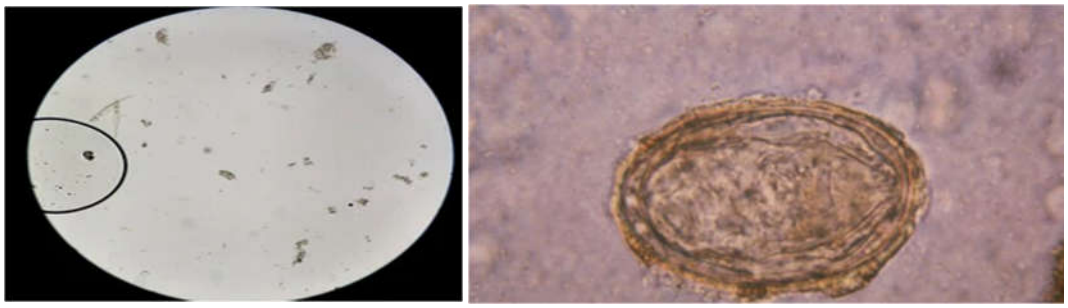

Fig.1. Microscopic view of sample containing ova and Schistosoma haematobium

The comparison of the two diagnostic techniques is displayed in Table 3. Additionally, there was a significant positive association (r=0.976) between the Poly membrane filtering method and the use of Medi-test Combi 10 reagent strips. Therefore, at the 0.05 level, the connection is significant. (P = 0.05).

4. Discussions:

Our research indicates that 52 people in Makurdi currently have urinary schistosomiasis, or 25.7% of the population. According to the criterion, a prevalence of more than 25.0% is considered moderate [8]. This prevalence is comparable to the 21.5% found in Ebonyi State. [9] Furthermore, other research revealed prevalence rates that were either greater or lower than what we found;

In Aninri LGA in Enugu State, Oguwuike found a high incidence of 45.4%; in Abia State, South Eastern Nigeria, a comparable frequency of 42.3% was observed [9,10]. Geographical and socioeconomic factors could be the cause of the observed variations in infection severity.

Our findings may have been significantly impacted by the age of research participants, despite other factors that affect the occurrence of urinary schistosomiasis, such as contact with water tainted with the parasite's cercariae. The study participants were between the ages of 6 and 20.

Table 1. Age distribution of S. *haematobium* infection among school children in Makurdi LGA

Age	Numbe rexamined	Number infected	(%Prevalence)
5-9	36	4	11.1
10-14	131	34	25.9
15-19	35	14	40
Total	202	52	25.7

Table 2. Sex distribution of S. *haematobium* among school children examined

Sex	No. examined	No infected	% Prevalence
Male	118	10	26.3
Female	84	21	25
Total	202	52	25.7

Table 3. Comparison between Combi 10 reagent strip screening results and filter paper

Location	No examined	Combi 10	Poly membrane filter
LGEA	80	52	33
Josephine	30	13	3
Daddy Memorial	53	27	8
Holy Family	39	19	8
Total	202	111	52

r= 0.976 P=0.05

Age group	Males exam-ined	No. of infected (%)	Females exam-ined	No. of infected (%)	Total
3–6 years	155	56 (36.1)	114	31 (27.1)	87 (32.3)
7–10 years	182	78 (42.8)	128	44 (34.3)	122 (39.4)
11–14 years	321	164 (51.1)	166	102 (61.4)	266 (54.6)
15–18 years	125	47 (37.6)	124	30 (24.0)	77 (30.0)
19–22 years	45	10 (22.0)	39	8 (20.5)	18 (21.4)
Total	828	355 (42.2)	570	215 (37.6)	570 (40.8)

Table.4. Prevalence of S. haematobium by age and sex in abiriba.

Age group	Positive infection with haematuria	Positive infection with-out haematuria
3–6 years	90 (22.0%)	39 (24.1%)
7–10 years	110 (27.0%)	26 (16.0%)
11–14 years	41 (10.0%)	47 (29.0%)
15–18 years	91 (22.3%)	33 (20.4%)
19–22 years	76 (18.3%)	17 (10.5%)
Total	408	162

Table.5. Sex-and age-related haematuria in S. haematobium infection

The study participants' sex distribution of S. haematobium infection revealed that males had a greater prevalence (26.3%) than females (25%). This is comparable to a prior report [11]. Males are reported to have a higher prevalence of urinary schistosomiasis than females. Due to differences in their water-use and contact behaviors, study participants' gender may have an impact on the prevalence of schistosomiasis. Due to frequent and prolonged interaction with the disease vectors' nesting place through swimming and farming, males are more likely than females to contract the infection.

In addition to the household tasks of washing and fetching water, which expose both sexes to infection, one of the primary causes of the high value is the greater propensity of males to

swim, play, and participate in other activities in rivers and other bodies of water. These investigations demonstrated that there was no discernible difference between male and female schoolchildren in terms of the prevalence of parasite infection. Although this difference in incidence is statistically insignificant, it may indicate that there is no gender-related relationship between the prevalence of urinary schistosomiasis or contact with polluted water in Makurdi LGA.

The age-specific prevalence of S. haematobium infection shows that the age group of 15–19 years old has the highest prevalence (40%) and the age group of 5–9 years old has the lowest prevalence (11.1%). However, there is no significant variation in the prevalence rate ($P>0.05$). This may be explained by the fact that members of this age group are more likely to engage in recreational activities like swimming, bathing, or playing in streams or other bodies of water that carry cercariae because they are very energetic and adventurous. This age group is most vulnerable to reinfection, which can happen through swimming or bathing in streams or rivers that contain the parasite's infectious condition, washing clothes, or ingesting tainted water.

This is consistent with earlier data [12,13,14,15,16] on the infection's frequency in several Nigerian research locations. Because schoolchildren are less exposed to epidemiologic factors that predispose them to the virus, the low prevalence observed in the 5–9 age group may be the result. According to this study, haematuria was the most common symptom among infected participants, occurring in 35% of cases. These significant hematuria prevalence rates are consistent with findings from a research carried out in Minna, Niger State, Nigeria [15]. The prevalence of proteinuria was found to be high at 50%. Clinically established morbidity indications of kidney infection with S. haemaobium include both proteinuria and hematuria.

Protein and frequently red blood cells escape into the urine when the glomeruli are injured, which is why S. haematobium may be linked to glomeruli pathology. The exact cause and clinical importance of proteinuria linked to S. haematobium infection are still unknown [15]. Hematuria, proteinuria, and the presence of ova in urine were all strongly correlated. This is consistent with previous studies [9,16]. The use of filter paper produced more accurate findings for S. haematobium Ova when comparing the two diagnostic methods because the majority of samples that tested positive for hematuria using Combi 10 lacked Ova [5]. In 8.5% of the samples that tested positive for haematuria, no S. haematobium eggs were found.

This may be explained by the fact that conditions other than S. haematobium infection, such as sickle cell anemia, urogenital infections, liver and kidney damage, and acute glomerulonephritis, can also affect blood in urine. Moreover, female menstruation may contribute to blood in the urine. The utilization of Medi-test Combi 10 reagent strips and the Poly membrane Filtration technology were found to be strongly positively correlated ($P=0.05$). Therefore, both methods are trustworthy for diagnosing S. haematobium. Because Combi 10 has a good predictive value for Schistosoma haematobium infection, it may be used for quick evaluation and is therefore an indirect diagnostic tool for detecting cases of hematuria.

Due to its speed, prompt results, and ability to identify all infected individuals at risk for urinogenital diseases other than schistosomiasis, it is appropriate for mass screening for the illness. By measuring semi-quantitative amounts of urine blood and protein, Combi 10 is an indirect diagnostic technique that, in addition to the direct detection of eggs, offers crucial hints for the diagnosis of urinary schistosomiasis. It is quick, easy, inexpensive, and used to identify those who are at risk of infection. It yields results right away and doesn't require any specialized

knowledge. However, although being reusable and rewashable, polycarbonate membrane filters are pricey.

They may be used to measure egg output, produce precise results, and require a large volume of urine. Since the results of these methods are more accurate for detecting ova, the standard for detecting cases of S. haematobium infection is based on microscopic analysis or urine samples for Schsitosoma eggs using polycarbonate membrane filter papers. These 12–14 nm filter sheets are highly costly, yet they are washable and reusable for several surveys. According to other authors' observations [17], the use of Combi 10 (Hematuria) as a diagnostic tool is supported, but not by itself, since the presence of Haematuria may not always be a sign of infection. It is an easy and affordable way to determine which group needs treatment.

Urinary Schistosomiasis can be detected early and quickly with Combi 10 before samples are sent for additional screening with Polycarbonate Membrane Filter Papers. Both Combi 10 and Polycarbonate Membrane Filter Papers can produce accurate and dependable data on the prevalence of Schistosoma haematobium infection, according to a comparison of the diagnostic methods for urinary schistosomiasis. According to statistics, the four schools in the study area have significantly different prevalences ($\chi 2$ CAL=25.80, $\chi 2$ TAB=7.815, $P<0.05$, and df = 3). Josephine International School North Bank has the lowest prevalence of the infection at 13.3%, while LGEA Primary School North Bank has the highest at 40%.

This might be because Josephine International School North Bank is a private school with mostly middle-class wards that have access to clean drinking and bathing water and are not near any bodies of water. On the other hand, there are more pupils infected at LGEA Primary School North Bank, which also has the greatest proportion of students with low infection severity. Because the majority of the pupils are from lower socioeconomic classes and rely on the water body for drinking, bathing, and utensil washing, the school is bordered by a water body that may be polluted with Cercariea of Schistosoma.

6. **Conclusion:**

In conclusion, Combi 10 is an excellent initial screening tool for quickly identifying presumptive cases of *S. haematobium* in endemic areas due to its low cost and ease of use. However, the filter paper method is the superior confirmatory diagnostic technique that should be used to confirm the diagnosis and assess infection intensity, which is essential for accurate treatment and public health surveillance. The two methods are often used in tandem: dipsticks for mass screening followed by filter paper microscopy for positive cases. According to the study's findings, Makurdi has a high frequency of urinary schistosomiasis among primary school students and is endemic for S. haematobium infections, which affect 25.7% of schoolchildren. These findings suggest that S. haematobium infection is endemic in Makurdi. The aforementioned results demonstrate that both the use of Combi 10 (Medi-test Chemical Reagent strips) for the detection of Hematuria and Proteinuria and the microscopic analysis of urine samples using Poly Carbonate Membrane Filters are dependable diagnostic techniques for the identification of Schistosoma haematobium infection. These techniques can also be used for quick evaluation and mass screening of the infection. Both of these are beneficial for epidemiological research and field work. A comparison of the two diagnostic techniques revealed a substantial positive association and the ability of both processes to provide accurate data on the disease's prevalence. Therefore, it is possible to recommend the use of Combi 10 (hematuria) as a diagnostic tool in order to identify the infection. The prevalence of S.

haematobium is highest in school-aged children (5–15 years), gradually declines in late adolescence, and remains relatively low in adults. This age-prevalence relationship is crucial for control programs, as it justifies targeting mass drug administration (MDA) with praziquantel at school-age populations, while still monitoring adults in high-risk communities.

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