

# Knowledge, attitudes, and practices on the prevention of intestinal Schistosomiasis in rural areas of Kimpese, Democratic Republic of the Congo

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## ABSTRACT

### Introduction

Schistosomiasis remains widespread in sub-Saharan Africa, particularly in the Central Congo Province of the Democratic Republic of the Congo (DRC), where it is endemic.

### Purpose

This study aimed to assess the knowledge, attitudes, and practices (KAP) of the rural population of Kimpese regarding the prevention of intestinal schistosomiasis.

### Methods

A random sampling technique was employed, using semi-structured and informal interviews to collect data.

### Results

The findings revealed that while 96% of respondents were aware of schistosomiasis, only 41% had knowledge of or practised preventive measures.

### Conclusion

These findings underscore the need to enhance health education and water sanitation initiatives to address this public health challenge.

## INTRODUCTION

Since his appearance on Earth, humans have continually been exposed to microbes – the agents of several diseases. As a result, they have persistently sought ways to achieve and maintain better health. However, the body's natural defences are not always sufficient to provide complete protection. Water, being a vital and indispensable natural resource for all living beings – especially humans – often serves as a medium for the spread of pathogenic microbes, thereby disturbing the biological balance of the body (Utzinger et al., 2007).

Several aquatic microbes, including schistosomes – the causative agents of schistosomiasis – cause an insidious and complex parasitic disease that poses a significant health challenge in Africa (Barsoum, 2013). Schistosomiasis is prevalent in tropical and subtropical regions, including Africa, the Middle East, Latin America, and Asia. It has also been reported in Corsica, specifically in the Cava River near Porto-Vecchio, and more recently, it was detected in the Solenzara River (Morvan, 2020).

In Africa, it is estimated that 80% to 90% of schistosomiasis cases remain untreated (Chitsulo et al., 2004). The Democratic Republic of the Congo (DRC) is one of the sub-Saharan African countries most affected by schistosomiasis. The disease is particularly prevalent in rural areas and near major rivers and lakes, where local populations frequently come into contact with water contaminated by the parasite (Barsoum, 2013).

The prevalence of schistosomiasis varies by region, with an estimated 20% to 30% of the population affected in certain endemic areas (Pearce & MacDonald, 2002). Low levels of knowledge about schistosomiasis, neglect, and a dismissive attitude (trivialisation of cases), coupled with the predominance of agricultural and market gardening activities among the majority of the population and the absence of developed water sources such as springs, boreholes, and other drinking water supply points, are the main factors contributing to the spread of the disease.

Assessing the knowledge, attitudes, and practices (KAP) of the population in Kimpese would help guide response strategies. The lack of data on the prevalence of schistosomiasis in Kimpese prompted this study, which aims to determine the level of knowledge, attitudes, and

practices of the rural population in Kimpese regarding schistosomiasis caused by *Schistosoma mansoni*.

## METHODS

### Environment

This study was conducted from 4 December 2023 to 29 March 2024 in the rural city of Kimpese, where schistosomiasis is a significant health problem. The population is largely unaware of the presence of this endemic disease, which is commonly referred to as "schistosomiasis." One of the rivers in the area is even named "Schistosomiasis River." Kimpese is located 11 km from Lukala, 55 km from Mbanza-Ngungu (the district capital), 122 km from Matadi (the provincial capital), and 220 km from Kinshasa. It is a Kongo-Congolese locality in Songololo, situated in the Cataractes District of the Central Kongo Province.

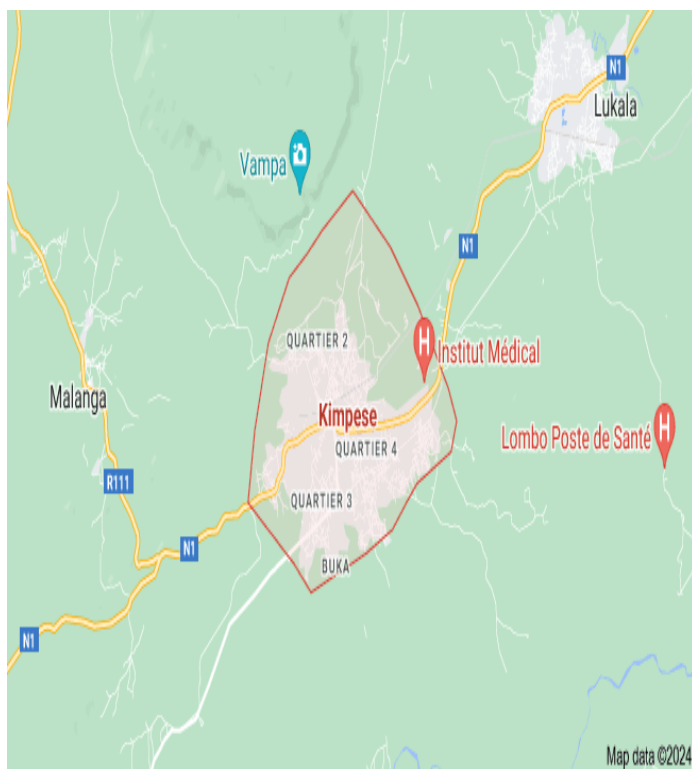
Kimpese experiences a savannah climate with a dry winter (classified as Aw under the Köppen-Geiger climate classification system). The region experiences significant rainfall, averaging 799.8 mm annually, with heavy rains even during the driest month. The average annual temperature is 25.6°C, which is slightly higher than Kinshasa's annual average of 25.3°C, where the rainfall is also higher at 1273.9 mm per year (Köppen-Geiger, 1961).

The city of Kimpese comprises four districts.

Figure 4:  
Map of the Central Congo Province (ANAPI)



**Figure 5:**  
Map of the Rural City of Kimpese, Study Site



### Equipment

The target population for this study includes men and women aged 15 to 65 years.

### Data Collection

The survey was conducted in accordance with the principles of the Declaration of Helsinki, which include the free consent of respondents and respect for human dignity (World Medical Association, 2013). This study employed a random sampling technique, using semi-structured and informal interviews. Semi-structured interviews were guided by a pre-established list of themes or questions, while informal interviews involved casual conversations aimed at assessing knowledge and eliciting responses (Kabena et al., 2020).

The sample was drawn from health facilities in proportion to their demographic weight and the availability of respondents. The rural city of Kimpese has a population of approximately 40,000 people. From this population, a total of 212 individuals were surveyed, comprising 95 men (44.8%) and 117 women (55.2%).

### Sample Size Calculation

The sample size (n) for this study was determined using the following steps:

1. **Determination of the initial sample size (n<sub>1</sub>)**

The initial sample size was calculated using the formula:

$$n_1 = \frac{Z^2 p(1-p)}{e^2}$$

where:

- z = the z-value corresponding to a desired confidence level (in this study, Z=1.96 for a 90% confidence level),
- p = the proportion of the estimated population (since no prior estimate was available, p = 0.5 was assumed to maximise variance), and
- e = the desired margin of error (assumed to be e = 0.1 in this study).

2. **Adjustment for population size**

The initial sample size was adjusted to account for the finite population size using the following equation:

$$n_2 = \frac{N}{N+n_1}$$

where:

- n<sub>1</sub> = the initial sample size, and
- N = the population size (in this study, N=40,000).

3. **Adjustment for sampling design effect**

The sample size was further adjusted to account for the design effect (*Deff*) using the formula:

$$n_3 = Deff \times n_2$$

where:

*Deff* = the effect of the sampling design (for simple random sampling, *Deff* = 1; for stratified sampling, *Deff* < 1; and for cluster or multistage sampling, *Deff* > 1). In this study, a simple random sampling (SRS) design was used, so *Deff* = 1.

#### 4. Adjustment for response rate

The final sample size (n) was adjusted to account for the expected response rate (r) using the formula:

$$n = n_3 \div r$$

where:

- $n_3$  = the adjusted sample size from the previous step, and
- r = the expected response rate (in this study, r = 65% or r = 0.65).

Based on these calculations, the final sample size was determined to be:

$$n = 152$$

#### Data Processing

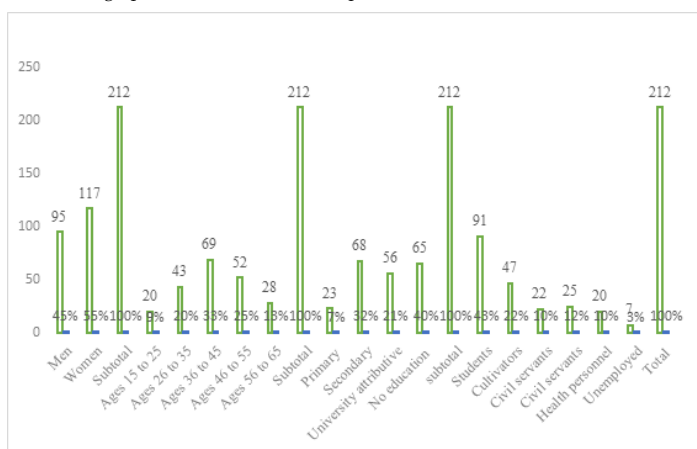
Data were processed using Excel software, which was employed for the construction of figures and the statistical analysis of the data.

### RESULTS

#### Socio-demographic Characteristics of Respondents

Figure 1 below illustrates the socio-demographic characteristics of the respondents.

Figure 1: Socio-demographic Characteristics of Respondents

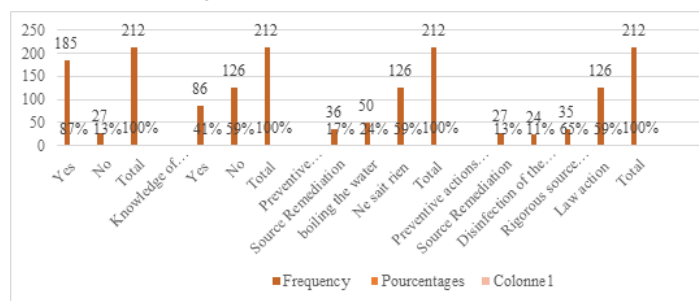


The graph reveals that the age group with the largest number of respondents is those aged 36 to 45 years, representing 33% (n = 69) of the sample. Regarding education level, 32% (n = 68) of the respondents had attained primary education, while 43% (n = 91) had completed secondary education.

#### Respondents' Knowledge of Schistosomiasis

Figure 2 below depicts the respondents' knowledge of preventive measures against schistosomiasis.

Figure 2: Respondents' Knowledge of Schistosomiasis

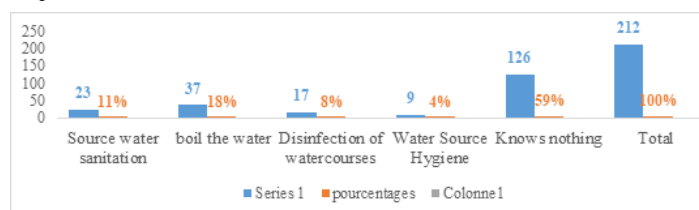


The Figure shows that out of 212 respondents, 185 (96%) were aware of schistosomiasis, while 27 (13%) were not. Regarding knowledge of preventive measures, 86 (41%) of the respondents were aware of them, while 126 (59%) had no knowledge of any preventive measures. Concerning the practice of preventive measures against schistosomiasis, 86 (41%) of the respondents engaged in such practices, while 126 (59%) did not.

#### Respondents' Attitudes Towards Schistosomiasis

Figure 3 below illustrates the respondents' attitudes towards schistosomiasis caused by *Schistosoma mansoni*.

Figure 3: Respondents' Attitudes Towards Schistosomiasis

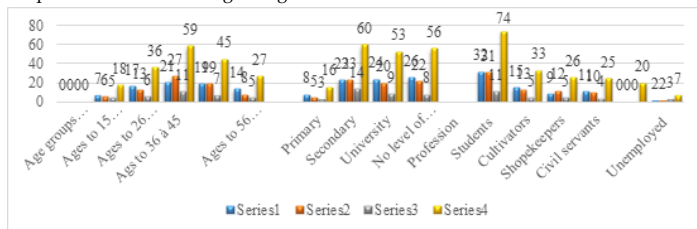


Out of the 212 respondents, 23 (11%) sanitized the water source, 37 (18%) boiled water, 17 (8%) disinfected watercourses, 9 (4%) practised water source hygiene, and 126 (59%) had no knowledge of water source hygiene.

#### Respondents' Practices Regarding Schistosomiasis

Figure 4 below shows respondents' practices when dealing with schistosomiasis caused by *Schistosoma mansoni*.

**Figure 4:**  
Respondents' Practices Regarding Schistosomiasis

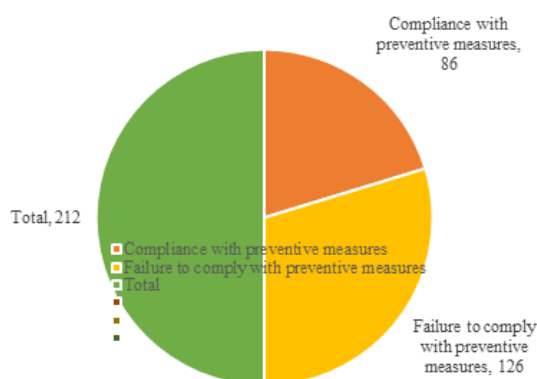


Out of 212 respondents, 78 (42%) reported seeking care at a health centre, 73 (40%) resorted to indigenous treatment, and 34 (18%) engaged in self-medication. The education level of respondents influenced their practices, with 81 (44%) of those with formal education visiting health centres, 70 (38%) using indigenous treatment, and 34 (18%) self-medicating. By profession, 89 (48%) of respondents went to the hospital, 68 (37%) used indigenous products, and 28 (15%) self-medicated.

*Adherence to Preventive Measures Against Schistosomiasis*

Figure 5 below illustrates the respondents' adherence to preventive measures against schistosomiasis.

**Figure 5:**  
Respondents' Adherence to Preventive Measures Against Schistosomiasis



The Figure reveals that out of 212 respondents, 86 (41%) adhered to preventive measures against schistosomiasis, while 126 (59%) did not comply with these measures.

**DISCUSSION**

*Respondents' Knowledge of Schistosomiasis*

The study revealed that out of 212 respondents, 96% had some knowledge of schistosomiasis, while 13% had no knowledge. Regarding knowledge of preventive measures, 41% were aware of them, while 59% were not. Moreover, 41% of respondents adopted at least one good practice to prevent schistosomiasis, while 59% did not engage in

preventive practices. This finding underscores the importance of increasing public awareness and promoting the adoption of preventive measures, as schistosomiasis is a life-threatening disease that can lead to severe health consequences, including death.

This result aligns with the findings of Dembélé (2010), who reported that the respondents' profession played a significant role in their knowledge, attitudes, and practices regarding schistosomiasis prevention. Dembélé emphasised that behavioural change towards adopting preventive measures is often slow, highlighting the need for mass education campaigns to promote healthy living and sustain anti-schistosomiasis actions.

*Respondents' Attitudes and Practices Towards Schistosomiasis*

The results indicate that out of 212 respondents, 11% sanitised water sources, 18% boiled water, 8% disinfected watercourses, 4% practised water source hygiene, and 59% had no knowledge of these practices. When examining practices, 42% of respondents reported visiting a health centre, 40% used indigenous treatment, and 18% self-medicated. Education level influenced these practices, with 44% of respondents who had formal education visiting health centres, 38% using indigenous treatment, and 18% self-medicating. Similarly, by profession, 48% visited health centres, 37% used indigenous treatment, and 15% engaged in self-medication.

These findings confirm that there is no direct relationship between age and susceptibility to schistosomiasis. Any individual, regardless of age, can contract the disease if they fail to adopt preventive measures. This result is consistent with the research of Agbeko (2019), who found that 19.9% of respondents identified contact with contaminated surface water as the primary mode of schistosomiasis transmission. Agbeko (2019) also observed that 26.4% of respondents knew that the disease could be prevented by avoiding contact with contaminated water.

According to the World Health Organization (WHO), individuals become infected with schistosomiasis through routine activities such as agricultural work, domestic chores, and recreational activities involving exposure to contaminated water. This study confirms that activities such as fishing, laundry, washing, bathing, cassava retting, and market gardening are high-risk activities that facilitate

the transmission of *Schistosoma mansoni* to humans (World Health Organization [WHO], 2020). As a result, schistosomiasis poses a significant threat to the population of Kimpese.

This study serves as a key source of information for communities in Kimpese, highlighting that knowledge and proper hygiene practices are essential for preventing schistosomiasis. The findings reinforce the importance of promoting public health campaigns and community education to reduce the disease burden in the area.

## CONCLUSION

This study aimed to determine the knowledge, attitudes, and practices of the Kimpese population regarding schistosomiasis. The findings revealed that more than two-thirds (185 subjects or 87%) of the population were aware of schistosomiasis as a disease but were unaware of the measures to control this endemic condition. The commonly reported modes of contamination included bathing and washing at water sources, particularly by farmers returning from their fieldwork before going home.

The persistence of the disease in this region can be attributed to unsafe practices, ignorance of prevention methods, and poor attitudes toward disease control. To address the ongoing prevalence of schistosomiasis in Kimpese, it is recommended that targeted health education campaigns be implemented and that access to improved water purification facilities be prioritised.

**Conflicts of Interest:** None declared.

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Kanku, B. T. <sup>1</sup> :	Nil identified
Mabubu, P. P. <sup>1</sup> :	Nil identified
Okito, D. W. <sup>1</sup> :	Nil identified
Amogu, J. D. <sup>1,2,4</sup> :	Nil identified
Kabena, O. N. <sup>1,2,4</sup> :	Nil identified
Tangou, T. T. <sup>1,3</sup> :	Nil identified

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