Original Article

Urinary Schistosomiasis in Gedarif: An endemic New Focus in Eastern Sudan

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ABSTRACT

Background: Schistosomiasis is endemic in many parts of Sudan. Despite the ongoing control activities, new foci are continuously discovered and documented.

Objectives: To document the prevalence of urinary schistosomiasis in Gedarif, Eastern Sudan, and to elaborate on risk factors for infection.

Materials and Methods: A community-based survey was conducted; all age groups attending a religious school (*khalwa*) in Elwadi District – Gedarif were included. Demographic and risk behavior data were obtained through a questionnaire. Fresh urine samples were obtained and examined microscopically in the field.

Results: Out of 480 volunteers participated, 260 (54.1%) were females. The mean age was 18.4(±17.1) years. The prevalence of urinary schistosomiasis was 9.4% among the study group. All of those affected were children and young adults (mean 11.82±2.98) years; 10 (22.2%) were in the age group 1 -10 years, and 35 (77.8%) were 11-20 years. The disease is more common among males 33 (73.3%). Most participants 312(65.3%) have no prior knowledge about the cause of the disease, nor the modes of its transmission 411 (85.6%).

Conclusion: Urinary schistosomiasis is endemic in Gedarif with the burden among children and young adults. Health education and sanitary management is needed for control.

Keywords: Schistosomiasis, Gedarif, Sudan.

Schistosomiasis affects hundreds of millions in Africa[1], and is a major health problem in many resource–limited countries[2], including Sudan. Despite the focal nature of its distribution, schistosomiasis is prevalent in many geographical areas of the Sudan[3-8].

The National Schistosomiasis and Soil-transmitted Helminthes Control Program (NSSCP) is active in many parts of the country, however, the outcome of the control activities are jeopardized by many risk factors that are known to impose negative impact. These factors include the improper man-water contact behavior, continuous movement of people between endemic and non-endemic regions, increased urbanization, poor sanitation and lack of awareness among the local community[1,9].

Schistosomiasis impairs the health as well as the social status of populations. The burden of the disease is in children and young adults with impact on physical growth, health and cognitive status[10,11].

The aim of this study was to document the prevalence of urinary schistosomiasis and explore the risk factors in a local community in Gedarif, Eastern Sudan.

MATERIALS AND METHODS:

Gedarif is one of the main cities in eastern Sudan. It lies from latitudes 13˚ 37' to 14˚ 04' N and longitudes 35˚ 28' to 35˚ 35' E. The total population is about 300,000 of various ethnic groups. Gedarif is famous for its large agricultural schemes and the production of seeds. Rainfalls provide water for both agricultural activities as well domestic use. Water pools or small dams maintain the supply during the dry season.

This is a cross-sectional educational-facility (*khalwa*) based study. The *khalwa* is a common religious school where Muslims of all ages gather to study Quran. *Elwadi*is one of the many districts of Gedarif city, with similar population characteristics to other

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districts, composed mostly of children and young adults. Small water collection pools constitute the main source of water for both drinking and domestic use. Most districts in Gedarif share the same risk factors; therefore, determining the situation in one district may reflect, to a large extent, the situation in other areas.

This survey was conducted during the period from March to April 2013. Demographic data, knowledge about schistosomiasis as well as risk behavior was documented through an interviewer-administered pretested questionnaire. Fresh urine samples from volunteers were obtained and immediately examined by direct microscopy after centrifugation for 15 minutes at 3000 rpm.

The data generated were coded, entered, validated and analyzed using Statistical Package for Social Science (SPSS) version 16.0. Chi squared test was used to assess differences between proportions of categorical variables. P value below 0.05 was considered statistically significant.

Ethical considerations:

An ethical approval was obtained from the Ethical Committee - Faculty of Medicine – Nile Valley University. This work was conducted with collaboration and supervision of the Ministry of Health- Gedarif State. For each participant adequate information was given about the purpose of the study and the voluntary nature of the participation. A verbal consent was obtained from each participant. Questionnaires were answered individually and in complete privacy. Names were kept confidential.

RESULTS:

In this study 480 participants were included. The demographic and social data are displayed in table 1. Knowledge and risk behaviors are shown in table 2.

Table (1): Socio-demographic characteristics of study population (n=480).

Variable		*n (%)*
Sex	Male	220 (45.8)
	Female	260 (54.2)
Age group	1-10	204 (42.5)
	11 - 20	145 (30.2)
	21 -30	28 (5.8)
	31 -40	41 (8.5)
	41 – 50	26 (5.4)
	More than 50	36 (7.5)
Educational level	Illiterate	53 (11.0)
	Basic school or khalwa	370 (77.0)
	More than 8 years education	11 (22.9)

Urinary schistosomiasis is confined to children and young adults, the mean age of affected was 11.82 (±2.98) years; of them4.5% (10/204) were 1 -10 years, and 24.1% (35/145) of those 11-20 years were affected. Schistosomiasis affects males more often than females 33(73.3%) versus 12 (26.7%), p = .000

DISCUSSION:

Disease surveillance and documentation of prevalence rates are important for the control efforts of the Neglected Tropical Diseases (NTDs), such as schistosomiasis.

To the best of our knowledge, this is the first report about schistosomiasis from Gedarif, Eastern Sudan. It is well known that improper man-water contact behavior is the major risk factor for schistosomiasis. In communities where sanitation is poor and safe drinking water is lacking there is a chance for water-related diseases to spread.

Urinary schistosomiasis is widespread different regions of Sudan[4,12-16].

In this study the disease is confined to children and young adults. Typically, rates and intensities of schistosomias is infection increase from an early age to a peak around age 8—15 years and decrease again in adults[1,17]. This finding is attributed to many facts such as higher rates of water activities, anatomical vasculature supplying genitourinary structures and immunological factors[3,5-8].

The mean age of infection in this study is similar to that reported in Nigeria[18].In the current study, schistosomiasis predominantly affects males. Sex-related patterns vary in relation to behavioral, professional, cultural, and religious factors[15].

Table (2): Risk behavior and knowledge about schistosomiasis among study population (n=480).

Variable		*n(%)*
Principal source of drinking water	Tap water	7(1.4)
	Wells or water pools	473(98.6)
Presence of a latrine at home	Yes	115(24.0)
	No	365(76.0)
Bathing in irrigation canals	Yes	143(29.8)
	No	337(70.2)
Knowledge about the cause of schistosomiasis	Yes	164(34.2)
	No	316(65.8)
Knowledge about the modes of transmission of schistosomiasis	Yes	69(14.4)
	No	411(85.6)
Knowledge about the common symptoms of schistosomiasis	Yes	96(19.6)
	No	386(80.4)
Know a family member affected by Schistosomiasis	Yes	60(12.5)
	No	420(87.5)
Know a family member died as result of complication of schistosomiasis	Yes	2(0.4)
	No	478(99.6)

The small dams and water collection pools in and around the study area constitute and ideal habitat for snails. As the distribution of the different schistosome species depends mainly on the ecology of the snail hosts. Natural streams, ponds, and lakes are typical sources of infection, but over the past few decades man-made reservoirs and irrigation systems have contributed to the spread of schistosomiasis[19]. The disease is largely a rural problem, but urban foci can be found in many endemic areas[20]. As urinary schistosomiasis is prevalent in many parts of Sudan; it may be assumed that movement of the seasonal farming workers played a role of dissemination of the disease in the study area.

The prevalence of schistosomiasis determined in this study (9.4%)is higher than that reported in North Sudan (1.7%)[3] but lower than that reported from South Kordofan (23.7%)[4], Darfur (56%)[5,7,8],and central Sudan (51.4%)[6]. However, the variation in prevalence may be due to sampling effects rather than the real situation in the studied communities; or else, may reflect the effectiveness of the control program, socioeconomic activities and local community awareness.

This study documents the high risk behavior among participants that include unsafe drinking water, lack of latrines and bathing in canals; added to that decreased awareness

about the disease. All these factors contribute to the propagation of the disease. Therefore, addressing these difficult issues may help control activities. It's well known that increased awareness about the negative health consequences of human helminthiases help improve the control strategies[9].

The limitations of this study include, among others, the cross-sectional design that may reflect a temporal situation. However, as the disease has an endemic nature and runs a chronic course this effect may besubtle. The other point of concern is the nature of those attending the *khalwa* may not actually represent the whole community of the city. This point can be argued by the fact that the *khalwa* in Sudan is a common place where most people gather, regardless to age, sex or occupation; therefore it is thought to be the most suitable place for such community-based study. In addition to these limitations, one district may not be representative for the whole city. However, putting into consideration the similar socio-cultural, demographic and environmental aspects may ameliorate the effect of district selection. As long as there are many water pools in Gedarif, called *Saraf* or *Hafeer*, used for domestic and agricultural use, the risk of schistosomiasis is similar for other areas.

CONCLUSION:

This study documents the prevalence of urinary schistosomiasis in the local community of Gedarif, eastern Sudan, and calls for the health authorities to augment the control activities in the region.

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Authors' contribution:
Both authors designed the study and wrote the manuscript. AT conducted the field work and WE did the statistical analysis, wrote and critically revised the manuscript. Both authors approved the final manuscript. AT is the grantor of the paper.

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